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Title of Thesis: Psychological Impact of Craniofacial Reconstruction: Pre- and Post-Operative Measures

Degree: Master of Education

Year This Degree Granted: Fall 2001

University of Alberta

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"IT IS DIFFICULT, MY DEAR LUCIUS, TO ESCAPE BECOMING THE PERSON WHICH OTHERS BELIEVE ONE TO BE. A SLAVE IS TWICE ENSLAVED; ONCE BY HIS CHAINS AND ONCE AGAIN BY THE GLANCES THAT FALL UPON HIM..."

- Thomas Wilder: The Ides of March

University of Alberta

Psychological Impact of Craniofacial Reconstruction: Pre- and Post-Operative Measures

By

Paula Blashko   ©

A thesis submitted to the faculty of Graduate Studies and Research in Partial fulfillment

Of the requirements for the degree of Master of Education

in

Special Education

Department of Educational Psychology

Edmonton, Alberta

Fall 2001

University of Alberta

Faculty of Graduate Studies and Research

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled PSYCHOLOGICAL IMPACT OF CRANIOFACIAL RECONSTRUCTION: PRE- AND POST-OPERATIVE MEASURES submitted by Paula C. Blashko in partial fulfillment of the requirements for the degree of MASTER OF EDUCATION in SPECIAL EDUCATION

Abstract

The pre-operative psychological dimensions of 212 patients undergoing surgical treatment for craniofacial deformities with either osseointegrated implants (intraorally and extraorally) or autogenous reconsruction. The patient sample varied in aetiology (congenital, neoplastic, trauma, bone-anchored hearing aids, combined type) with a variety of injury sites including those both intraorally and extraorally. Eight-eight of these patients completed a post-surgical battery of questionnaires. A further 42 patients completed a second post-operative battery. The psychological battery for each assessment period included the Basic Personality Inventory (BPI) and Campbell's Sense of Well-Being Scale. Pre-operative results indicated above average scores on seven scales of the BPI and differences in Well-Being for the groups assessed. The first post-operative assessment revealed significant decreases in scores of some scales of the BPI for the group and no changes in Well-Being. The second post-operative assessment results indicated a return of scores to pre-operative levels on both the BPI and Well-Being Scale.

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Chapter 1

Physical appearance is the most visible trait of a person. Facial attractiveness plays a dramatic role in an individual's interpersonal interactions, in how others perceive and respond to the individual, and even the individual's personality development (Patzer, 1985). Most of the functions associated with human interaction revolve around the face and neck (David & Barritt, 1982). Speech, subtleties of expression controlled by facial muscles, and the ability to eat and drink in a socially acceptable way with one's family and friends is of great importance (Liggett, 1974). When people are forced to cope with a facial defect, whether the aetiology is congenital or trauma-based, they are confronted with dramatic change in the facial form and function, which can be devastating to their sense of self-worth.

In most human societies, one of the many factors that tends to operate to the detriment of the facially deformed is the especially high premium placed on physical attractiveness. Cosmetic and beauty augmentation is a billion dollar industry. This cultural bias not only disadvantages people who, due to their defect, deviate from the norm, whether in a relatively minor way or in terms of a significant deformation. This can have an effect on social interactions and the development of a positive self-concept (Bull & Rumsey, 1988). The profound social significance of the face, taken together with society's prejudices towards those that have an atypical appearance, can mean that a facial disfigurement could be a severe social handicap and have consequences on the personality development of the individual.

Facial disfigurement and attempts made to repair both function and form have been and continue to be a formidable challenge for the reconstructive surgeon and the other professionals involved in the patient's recovery. While great advances have been made in surgical construction using the patient's own tissue (autogenous reconstruction), the technique remains difficult in technical terms, and is not applicable to all forms of facial disfigurement (Wilkes & Wolfaart, 1994). The alternative treatment is to create a prosthesis. The prosthesis must improve appearance, have high functional performance, be biocompatible, and be retained properly (Wilkes & Wolfaart, 1994). In the past, these criteria have not necessarily been met due to the following limitations in technology and technique: the prosthesis has to be retained through adhesive or mechanical attachment. Use of adhesives and mechanical retainers are often both clumsy and cumbersome, resulting in frequent failure of retention, discomfort, or poor aesthetic properties. These effects often impacted the patient in a negative way due to severe embarrassment or the inability of the individual to integrate the prosthesis into the their sense of self (Wolfaart & Wilkes 1994). The prosthesis remained a foreign body.

Remarkable advances have been made in the area of prosthetic attachment, through development of the concept of osseointegration. Osseointegration involves the use of commercially pure titanium which can be implanted into the bone and, after an adequate period of healing, load-bearing superstructures can be connected to the titanium implants. This has improved prosthesis stability and this biotechnology is largely regarded as the most significant advancement in the field of facial prosthetic restoration in the past three decades (Parel & Tjellstrom, 1991).

Research into the psychological forces affecting patient recovery after reconstruction or prosthetic attachment is of great importance to the professionals working in the area of oral and maxillofacial rehabilitation. They have found that one of the main reasons for failure in treatment has been the poor assessment of, and assistance with, the patient's psychological condition (Jensen, 1978; Wilkes & Wolfaardt, 1988).

This particular study is concerned with a broad range of types of patients that have oral and maxillofacial deformities. The patient population consists of individuals requiring intraoral dental reconstruction and prosthetics, extraoral reconstruction and prosthetics, autogenous reconstruction, and people with audiological difficulties requiring augmentation of sound through attachment of a bone-anchored hearing aid. The primary goal of the study is to describe the patient population in terms of psychological personality variables and well-being prior to reconstruction and rehabilitation and to re-examine these variables after intervention. The general population of craniofacial patients as well as the specific sub-populations, as described above will be evaluated using the specific psychometric instruments chosen. This study is also intended to help establish a psychometric battery that will help screen individuals for psychological illness or imbalance prior to and after reconstruction, so that the individuals concerned may be directed to appropriate treatment programs. This is intended to improve the overall treatment process and aid in successful recovery.

Overview of COMPRU

The data for this study was collected with the co-operation of the Craniofacial Osseointegration and Maxillofacial Prosthetic Rehabilitation Unit (COMPRU). This unit

is based in the Misericordia Hospital in Edmonton Alberta. Historically, osseointegrated alloplastic reconstruction and autogenous reconstruction have been performed at different centres by different surgical subspecialties. The prosthetic design and formation are often completed at another location. COMPRU is comprised of a team of specialists that provide reconstructive and rehabilitative care working out of one centre and offering a multidisciplinary, integrated approach to patient care. This unit offers both conventional prosthetics and osseointegrated implants for dental and facial abnormalities. Dr. Wolfaart and Dr. Wilkes head the team and have incorporated specialists in the areas of Dentistry, Plastic Surgery, Otolaryngology, Audiology, Speech Pathology, Prosthodontics, Cell Biology, Dermatology, Engineering, and Psychology. This large team administers to the unique reconstructive and rehabilitative needs of patients that cope with head and neck defects.

The COMPRU patient population is highly varied. The population subgroups include those described in the previous section. To reiterate, this population includes intraoral dental reconstruction, extraoral reconstruction, autogenous reconstruction, and bone-anchored hearing aid recipients. Many of the extraoral patients in this population require the construction of prosthetics for the ear, nose, or eye areas. Patients also varied according to the aetiological basis of their defects, ranging from congenital anomalies, cancer, trauma, or burns. When possible, the patient's own tissue was used to reconstruct the missing features. If that was not possible or desirable, artificial parts (prostheses) were constructed and fitted with synthetic materials. COMPRU afforded a

unique opportunity to examine and evaluate the unique collection of individuals that live with head and neck defects.

Theoretical Framework of the Present Study

Given the aforementioned diversity in the medical history and treatment options of the patient population, the theoretical basis for studying the psychological profiles and changes must be gathered from a variety of research areas. Rsearch into the psychological impact of alterations made to the facial area include studies of: voluntary cosmetic surgery (Deaton & Langman, 1986; Napolean, 1993; Napolean, 1998); congenital craniofacial deformity (Rosa, Fananas, Bracha, Torry, & Van Os, 2000; Glasper & Powell, 1999; Berk, Marazita, Cooper, 1999; Endriga & Kapp-Simon, 1999; Sarwer, Bartlett, Whitaker, Paie, Pertschuk, & Wadden, 1999); deformity caused by disease or cancer (De Boer, McCormick, Ryckman, & van den Borne, 1999; David & Barritt, 1982; Pruzinsky, 1992; Rafanelli, Park, Ruini, Ottolini, Cazzaro, & Fava, 2000; list & Stracks, 2000; de Graeff, de Leeuw, Ros, Hordijk, Bingham, & Winnubst, 2000); traumatic injuries to the facial area (Butler, 2000; Gilboa, Bisk, Montag, & Haggai, 1999; Bernard, 2000; Meyer, Bishop, Rosenberg, Murphy, & Blakeney, 1999; Peterson & Topazian, 1976) and; dentofacial deformity (Cunningham, & Garratt, 2000; Cunnigham, 1999; Kent, 1992; Kiyak, Weat, Hohl, & McNeill, 1982; Rogers, McNally, Mahmoud, Chan, & Humphris, 1999).

Patients also vary according to the specific location and severity of their facial deformity. Personality variables and demographic variables are all important and vary to a great degree in the population of craniofacial patents. A multiplicity of variables can

have an impact, at any time, on the medical and psychological coping strategies in each of these populations. It is not likely that a single, simple psychological profile for the "craniofacial patient," exists because of all the factors that come into play during psychological development. We seek to evaluate the similarities and differences in each of the groupsthat make of the craniofacial population.

A substantial amount of research in the area of disfigurement to the face centres around the "physical attractiveness phenomena," (Bull & Rumsey, 1988) and the "beauty is good myth," (Pertschuk & Whitaker, 1987). Physical appearance, especially of the face, is frequently cited as playing a central role in an individual's interpersonal interactions, in how others perceive and respond to the individual, as well as the development of the individual's self-concept and sense of well-being. It is a commonly held belief that physical attractiveness exists on a continuum, ranging from extraordinary beauty to profound ugliness. Some literature cites craniofacial disfigurement as existing on the negative end of the continuum (Bull & Rumsey, 1988; Pertschuk & Whitaker, 1987). This conceptualization suggests that the individual is subjected to negative reactions and prejudice that interfere with psychological functioning. Other literature suggests that craniofacially deformed individuals may be subject to an entirely different social experience, as members of a stigmatized group, than the unattractive individual (Bennett & Stanton, 1993). This type of literature describes the disfigured as being regarded as handicapped, subjected to sympathy and helping, or toavoidance. Whether the craniofacially anomalous person is regarded in a negative fashion or with sympathy,

the results are essentially the same. The person is forced to cope with negative social and psychological stressors (Pruzinsky, 1992) that affect well-being and self-concept.

Most research indicates that reconstructive surgery, both autogenous and that involving osseointegrated implants (alloplasty), has a positive impact on the quality of life of the patient. This is accomplished by restoration of function and aesthetic properties. Sela and Lowenthal (1980) found that maxillofacial restoration with traditional prosthetics had a positive impact on patient self-esteem and attitude towards life in 85% of their patient population. This study continues to examine the influence of reconstruction and rehabilitation on the patient population's psychological charactersitics and satisfaction with life. In particular, when the individuals are involved in an environment that co-ordinates several experts dedicated to the improvement of techniques necessary for rehabilitation and thus the improvement of the patient population's quality of life.

This study addresses several areas of concern. First,to establish if this group of patients as a whole differs from the norm population in terms of psychological and psychosocial dimensions. Next, to delineate differences in psychological measures based on the aetiological basis of the injury or defect. Using a measure of sense of well-being, differences, if there are any, will be elucidated for each aetiological group. Lastly, a comparison of the patients before and after surgical intervention and rehabilitation will be made to see if any changes have occurred in the psychological and psychosocial measures, or sense of well-being.

Definitions

The following terms will be used for this study:

1. *Craniofacially Deformed/ Craniofacial Defect/ Craniofacial Disfigurement/ Facial Disfigurement-* in the general body of this study these terms refer, usually interchangeably, to patients with injuries or defects pertaining to the head and neck regions including: eye orbits, nasal area, cheek areas; dental and jaw structures (maxillar and mandibular); and temporal/parietal, frontal skull structures; as well as ear structures.

2. *Intraoral Surgery/ Surgical Reconstruction-* surgical techniques involving the restructuring and installation of osseointegrated implants for dental, maxillary, and mandibular regions.

3. *Extraoral Surgery/ Surgical Reconstruction-* surgical techniques involving the restructuring and installation of osseointegrated implants for face, skull, and ear structures.

4. *Osseointegration-* technique whereby commercially pure titanium is placed into bone, and after a period of healing, load-bearing superstructures (prostheses) are connected to the implants.

5. *Autogenous Reconstruction-* surgical techniques involved in reconstruction using the patient's own tissue as the graft material.

6. *Alloplasty-* surgical procedure with the specific goal of producing an osseointegrated platform for the attachment of a prosthesis made of synthetic substances.

Scope and Limitations of the Study

Several issues must be kept in mind when interpreting the results of this study. While there are 212 subjects in the pre-treatment group and 88 in the post-treatment group, generalizability may be limited to craniofacially disfigured patients that have their rehabilitative needs met within the interdisciplinary setting of COMPRU, which aims to meet all their needs from assessment to recovery. Limitations may also present when interpreting the data as each of the aetiological subgroups is small, ranging from 8 to 45 (BAHA) patients per group. The generalizability of the results should be limited to populations with comparable characteristics.

This study is also limited by the inconsistent method of administering the questionnaires. It was exceedingly difficult to control all aspects of administration such as the amount of time between giving the pre-treatment questionnaire and the surgical date and prosthesis fitting and post-treatment testing. The patients at COMPRU are from all over Canada thus scheduling and the complexity of obtaining OR time, as well as follow-up protocols were essentially impossible to keep consistent.

Another limitation that is a cause for concern is the possibility of response bias when the patients answered the items on the questionnaires. While the psychological assessment tools were presented to the participants as a means of helping meet their needs and they were ensured that it would not affect their participation in COMPRU, it is still possible that some interpreted this effort as a screening tool for acceptance to the program. This may have skewed some of the responses in a direction that the patient felt would facilitate their involvement with COMPRU.

Outline of the Study

Chapter 2 represents the review of literature of the research on the psychological and psychosocial impact of craniofacial deformities and rehabilitation. Literature regarding self-concept, the psychology of facial appearance, as well as review of studies concerning the different aetiological groups will be discussed. The use of standardized psychometric instruments in assessing the needs of craniofacial patients will also be discussed.

Chapter 3 outlines the methodology, including the design, pilot study, data collection and analysis, as well as limitations of the methods. Chapter 4 presents the results, including analysis and evaluation of evidence. Chapter 5 contains the summary, conclusions, and recommendations based on the study's results.

Chapter 2 Literature Review

The rehabilitative treatment that patients with craniofacial defects undergo may have a substantial effect on their social and psychological functioning (Weymuller, Yuch, Deleyiannis, Kunta, Alsarraf, & Coltrera, 2000). Literature indicates that appearance influences social roles and functioning, and that attractive people are usually favoured while those with features that deviate from the norm are devalued (Pertschuk & Whitaker, 1982). It is within this context that we may begin to explore the psychological issues that are associated craniofacial deformities. Intrapersonal and interpersonal characteristics expressed by this type of patient population are the primary variables that will be explored.

This review seeks to evaluate the literature relevant to those living with, and receiving treatment for, a craniofacial deformity A multiplicity of psychological factors are involved in the rehabilitation of patients undergoing surgical treatment. Injury to, or a defect in, the facial region, and the consequent need for rehabilitation are thought to have an impact on both the interpersonal and intrapersonal psychological aspects of the individual. With the extraordinary progress made in the surgical treatment of craniofacial anomalies, especially using the technique of osseointegration for prosthetic attachment, the lives of patients potentially change in a substantial way.

There is a body of evidence and ongoing research into rehabilitative surgical techniques for aiding in the recovery of function. However, literature related to the reconstruction of facial form and its impact, in terms of acquisition of an altered appearance, is relatively sparse. This appears to be due, in part, to the fact that those

that are craniofacially disfigured differ in terms of the aetiological basis and specific type of defect. Consequently, the results of much of the research are highly varied, making it difficult to draw broad conclusions as to what the specific variables that affect recovery and well-being for this population is. There is a lack of standardized psychological measures utilized in these studies, making comparisons between studies difficult (List & Stacks, 2000). Studies also often lack the use of control groups in studying the impact of treatment (Deaton & Langman, 1986; Doctor & Powers, 2000). Most studies also have very small samples or are in a case-study format, which imposes limitations on the confidence in and the generalizability of the results. This review will summarize and collate findings in order to elucidate similarities and differences among the craniofacial population and its subsets.

As was discussed in the first chapter, the patient population of COMPRU is made up of individuals with various craniofacial defects or injuries involving areas such as the face, ears, and intraoral area.. These patients differ aetiologically, including congenital, traumatic, and oncological origins of deformity. Some patients have more than one defect. Patients are treated, depending on the nature of the injury, by a number of rehabilitative procedures, including autogenous reconstruction and osseointegrated prosthetics. Regardless of the procedure used, the goal of treatment is to recover function and form as much as possible. There is also a specific subset of patients that is treated for hearing impairment of the conductive kind, rather than facial deformity per se (though osseointegrative techniques are applied). Given the diversity of the COMPRU patient population, it is not unreasonable to expect differential and shared features

within the psychological and psychosocial profiles of the population as a whole, as well as the subsets of the population when divided on the basis of aetiology.

Several areas of research will be reviewed in the current chapter. The first evaluates the link between physical appearance and the individual's psychological and social health. The area addresses the literature that explores craniofacial defects in general, and populations that require reconstruction and rehabilitation of the oral and maxillofacial areas. Studies that are relevant to this broad population, according to aetiological differences such as congenital (primarily cleft-palate), trauma, and oncological patients will be explored in more detail, in order to establish shared and divergent psychological characteristics. Patients that undergo elective cosmetic surgery will also be included in this section considering that much of the research performed on this population provides a foundation for craniofacial deformity research.

Many patients with craniofacial deformities receive surgical rehabilitation through autogenous reconstruction or osseointegrative techniques thus a review of known outcomes will be included in this review. A brief review of research involving those with hearing impairment and their psychological features and interactive patterns will also be included, as they constitute a substantial proportion of the COMPRU patient population. The last section of this review will outline research that has used the Basic Personality Inventory, in order to establish its relevance as a psychometric tool for the current study.

Physical Appearance and Psychological Health: Theoretical Foundations

Research on physical attractiveness is conducted in a variety of disciplines and has produced findings that span the continuum of human life. It is widely recognized that physical attractiveness, especially that of the face, has a pervasive influence on the lives of almost every person in today's society (McGrouther, 1997). Most of human interaction centres on the face (David & Barrit, 1982). It represents the most visible trait of a person. The face plays a dramatic role in an individual's social interactions, in how others perceive and react to the individual, and even in the development of the individual's personality (Patzer, 1985).

Pertschuk and Whitaker (1982) indicate that appearance influences social role and functioning and is, in general, supportive of a connection between appearance and social acceptability. The face carries information that is usually the first available to the perceiver and is continuously available during social exchange (Bull & Rumsey, 1988). The level of physical attractiveness plays a dramatic role in an individual's interpersonal and intrapersonal development (Elks, 1990).

One of the most widely cited conclusions from research is summarized by Dion, Berscheid, and Walster's (1972) claim that, in people's perceptions of others, "what is beautiful is good" (p.285). This statement linking beauty and goodness suggests the existence of a stereotype whereby physically attractive individuals are believed to possess a wide variety of positive qualities (Ashmore & Longs, 1991). In the classic study on the physical attractiveness stereotype, Dion and her associates (1972) had subjects rate facial photographs that had been selected on the basis of the judge's

agreement that the pictured individuals were low, medium, or high on physical attractiveness. Subjects' ratings pertained to various personality traits as well as life outcomes such as marital happiness and career success. The results suggested that respondents ascribe more favourable personality traits (kinder, brighter, more likeable) and more successful life outcomes (better jobs, higher salaries, more successful marriages) to the more attractive individuals. As attractiveness decreased so did the positive attributions. Two published studies of children's reactions to adult faces found evidence that children display negative stereotyping when observing unattractive faces, and positive stereotyping to attractive faces (Elliot, Bull, James, & Lansdown, 1986; Rumsey, Bull, & Gahagan, 1986).

Most reviews of the literature agree that the beauty-is-good stereotype is a strong and general phenomenon (Dion, 1986; Hatfield & Specher, 1986). Most secondary sources, especially introductory social psychology textbooks, have treated the beauty-is-good stereotype as a homogeneous, powerful, and firmly established phenomenon (e.g. Baron & Burn, 1987 p.187; Deaux & Wrightsman, 1988 p.250). The question that then arises from this phenomenon is: What are the inter- and intrapersonal consequences of this stereotype?

Physical attractiveness appears to be a determinant of differential attention (Hazlett & Hoen-Saric, 2000; Patzer, 1985). Research shows that persons of higher physical attractiveness receive a significantly greater frequency of positive looks and smiles than do those that are less attractive (Kleck & Rubenstein, 1975). Based merely on physical appearance, people formulate comprehensive ideas about an observed

person (Marshall, Stamps, & Moore, 1999). Furthermore, people exhibit different non-verbal behaviours (smiles, gestures, eye-contact) in the form of either positive or negative responses. The exact   implication of such general social approval and disapproval may represent social acceptance or lack of acceptance of a person or their behaviour (Marshall et al., 1999). Regardless of social inequalities and moral ramifications, physical attractiveness, and the higher expectations associated with it, appears to open doors for those that possess this characteristic while closing doors for those that do not (Watkins & Johnston, 2000).

It is believed that expectations can produce psychological and psychosocial characteristics in others. This is referred to as either the Pygmalian effect or the self-fulfilling prophecy, whereby people conform and internalize what others expect of them or are perceived to expect of them (Adams & Read, 1983). This implies that through the continual process of interacting with, and responding to others, the development of personality occurs. A relationship between physical attractiveness and intrapersonal characteristics is supported both theoretically and empirically (Ashmore & Longo, 1991). Ashmore and Longo (1991) state that society holds different expectations for individuals of varying levels of physical attractiveness, then those individuals are likely to internalize those expectations. The theoretical outcome is that people will yield to self-fulfilling prophecy by actually evolving into discrepant persons according to their physical attractiveness (Davis, Dionne, & Shuster, 2000; Milkie, 1999).

Research has specifically addressed personality characteristics possessed by those of different attractiveness levels. Overall, the data supports a general postulate

that interpersonal perceptions reflect actual intrapersonal realities within the recipient, particularly the person's inner cognitive concepts. This is supported by Harter's (1999) review of self-concept construction, which describes the development of self-concept as a social construction based on interactions with others. This process involves communication of attitudes, expectations, and behaviours between people. Subsequently, an individual adopts a role congruent with societal messages- resulting in a mirrored self-image (also called reflected appraisals) (Veerkuyten, 1995; Jalengo, 1999). Those that are attractive rate higher in terms of self-esteem, self-worth, self-concept, and self-concept stability (Santor, Walker, 2000; Wade & Cooper, 1999; Milke, 1999). When someone is unattractive the opposite is reported.

Psychological Health of Craniofacially Deformed People

Much of the research on physical appearance and psychological well-being assumes that physical attractiveness is on a continuum. The extremes range from supernatural beauty to extreme ugliness, with the majority of the people falling somewhere in between (Bull, 1983). Often, in this research, the assumption is then made that craniofacial deformity can be equated with extreme unattractiveness (Bennet & Stanton, 1993). For these reasons it is thought that the craniofacially deformed individual is subjected to social prejudice and negativity.

The dependence of self-concept on physical attractiveness is especially pronounced for those who are at the extremes of the continuum (Adams, 1977b). This reasoning is based on the notion that among the many ways of describing oneself we

tend to use descriptions that are most distinctive and set us apart from our peers (McGuire & Padaver-Singer, 1976). If, as much literature has noted, the individual develops their self-concept and other intrapersonal characteristics, in part, due to the mirrored self-image cast by society, it is the objective and subjective experience of the individual that will define them (Patzer, 1985, p.130). Despite indications that the possession of an aesthetically unattractive appearance may impair social and psychological function, it seems that little attention has been paid to individuals with facial disfigurement (Macgregor, 1974). Macgregor (1990) describes people with moderate to severe facial deviations as "marginal" or "forgotten" people. While the literature is limited, there is some research that has attempted to describe social and psychological dimensions of those with craniofacial anomalies.

People that have deformities or anomalies that affect facial appearance are thought to experience increased vulnerability to psychological difficulties (Pruzinsky, 1992). Investigations of children born with facial deformities have shown decreased self-esteem, increased anxiety, behavioural problems, social withdrawal, and social interaction problems (Broder & Strauss, 1989). Less is known about adults with craniofacial anomalies. Adults with disfigured faces seem to have more social, marital, and financial difficulties when compared with controls (Macgregor, 1990). Many authors also report that social interactions with others are the greatest area of complaint and distress for facially disfigured adults (Macgregor, 1990; Partidge, 1997).

As a whole, the body of psychological research on persons with craniofacial deformities repeatedly suggests that the greatest problems appear in the realm of social

interaction (Sarwer, Bartlett, Whitaker, Paige, Pertschuk, & Wadden, 1999). Sarwer and his colleagues comment that such difficulties likely lie on a continuum. This continuum may range from a stranger's unwanted stares to overt discrimination in employment settings (Bull, 1990; Harter, 1999). Macgregor (1990) stated that for those whose faces do not conform to the norm, the process of social interaction is a source of unremitting stress, anxiety, and anguish, all of which have negative implications for personality functioning.

The previous section of this review described the development of self-concept and personality through reflected appraisals during social interaction. McGrouther (1997) stated that while distressed each day by the reflection of their image, as much, if not more hurtful and damaging to the disfigured individual's self-esteem and self-image, is seeing their own flawed faces reflected in the reactive behaviour of the non-disfigured. In addition, during the daily life of the facially disfigured, they are not accorded the same social respect as individuals without deformity (Pruzinsky, 1992; Bull, 1990); Bull & Rumsey, 1988). The facially disfigured are subjected to visual and verbal assaults, and a level of familiarity from strangers that is excessive such as: naked stares, startle reactions, whispering, remarks, furtive looks, personal questions, advice, manifestations of pity or aversion, ridicule, and outright avoidance (Macgregor, 1990; Pruzinsky, 1992; Rumsey & Bull, 1986; Rumsey, Bull, & Gahagan, 1986).

Individuals with facial disfigurement are subject to the intense psychological and social burden of stigmatization (Hill-Beuf, 1990; Crocker & Major, 1989).

Stigmatization refers to the social process whereby:

> "Individuals who by virtue of membership in a social category are vulnerable to
> being labelled as deviant, are targets of prejudice and discrimination, or have
> negative economic or personal outcomes." (Crocker & Major, 1989 p. 609)

Individuals with craniofacial defects share many of the negative effects of stigmatization experienced by other individuals with visible handicaps (Shontz, 1990). However, facial disfigurements are ranked among the least desirable handicaps by both children and adults (Hill-Beuf & Porter, 1984). While some authors may argue that membership in a stigmatized group can protect self-esteem (Ross, Eyman, & Kischuk, 1986), seeking out other members of society that have facial anomalies for the purpose of social comparison and a supportive in-group is not a simple matter for craniofacially deformed people. Unlike people that may attract each other on the basis of religion, ethnicity, or other stigmatizing feature such as blindness or deafness, there is no such organization for those with a disfigured face. Additionally, unlike those who are aged, blind, or deaf, with whom relationships can be established by the fact of their special and well-defined needs for assistance, and general public knowledge about such qualities, there is nothing of this nature that can be applied to making contact with the disfigured (Macgregor, 1990; McGrouther, 1999).

While the safety of belonging to a group that is stigmatized may not necessarily pertain to the craniofacially disfigured, the literature regarding social processes surrounding stigmas may. It is this literature that undermines the validity of making assumptions about craniofacially deformed people on the singular basis of the physical attractiveness literature. Bennet and Stanton (1993) note that the theoretical basis

underlying much research on craniofacial disfigurement assumes that this population differs little from the normative population in any major way, except for being unattractive, albeit in a specific and more severe way. This assumption suggests that the variables that influence the development of the craniofacially anomalous differs only from the normal population in degree rather than some other process. The fact that there are inconsistencies in research findings suggests that other processes may be at work or be working in concert with the attractiveness stereotype in terms of psychological and psychosocial development of the disfigured (Pertschuk & Whitaker, 1987).

As suggested above, an alternative orientation to comprehending the psychological and psychosocial development of the facially deformed lies within the literature that discusses physical stigmata, which has a different approach to the development of self-concept (Pertschuk & Whitaker, 1987). An attribution-based model has been postulated to account for some of the inconsistent findings of the physical attractiveness literature that pertains to craniofacially disfigured people (Crocker & Major, 1989). They suggest that some individuals use their stigmatized status to enhance their self-esteem, which is consistent with some of the studies that find craniofacially deformed patients to have self-esteem levels similar to that of the normal (non-deviant facial features) population (Cunningham, 1999). The attribution-based theory postulates that the stigmatized individuals will attribute any negative feedback to their stigma, rather than to more general aspects of their self, thereby protecting their self concept (Crocker & Major, 1989). Overall, there is not a substantial amount of

literature that advocates the stigma theory over the attractiveness stereotype theory in terms of the development of the craniofacially deformed, but it is significant.

While it may be relatively safe to say that the average person has sympathy for those with flawed faces, complex psychological reactions aside, some people are so aesthetically repelled and even threatened by the site of abnormality that, despite genuine feelings of compassion, they are unable to cope with or maintain a face-to-face situation appropriately (Pertschuk & Whitaker, 1982; Bull, 1990). Others may find interaction difficult because they are distracted or put off by the defect. When compounded with the powerful stereotypes that we have regarding physical attractiveness, or lack of it, the problems of social activities are worsened. This distraction is evident in behaviours of avoidance or other distorted social interaction (Bull, 1990).

The psychological cost of the emotional strain of abnormal social interaction has consequences for the facially disfigured, such as depression, poor personal adjustment, anxiety, and a poor sense of well-being (Macgregor, 1974, Pertschuk & Whitaker, 1982). There is no doubt that the prejudice, negative social reactions of others, and discrimination have substantial negative social, economic, and psychological consequences for people that have disfigured faces (Crocker & Major, 1989).

Much of the literature describes the outcomes of craniofacial disfigurement in terms of psychological and psychosocial damage. It is important to note the criticisms levelled by several authors. While many authors note that psychological deficits are pervasive among the craniofacially deformed, these deficits were rarely profound and

represented limitations rather than severe psychopathology (Pertschuk & Whitaker, 1988). Some critics also question that the development of a healthy self-concept and emotional stability is based primarily on physical appearance (Bennett, Stanton, Pertschuk, & Whitaker, 1988; Bull & Rumsey, 1988).

There is no doubt that other factors contribute to the development of a healthy self-concept and emotional stability. Such factors include: personality factors, such as sense of humour and temperament; family circumstances; and family support. It is also the interaction of these variables that may contribute to distress or maladjustment. These influences may also act as protective mechanisms that inhibit or mediate the negative impact of having a craniofacial deformity (Pruzinsky, 1993). One must also keep in mind that a substantial amount of literature uses a basis of reasoning that is primarily theoretical and has yet to fully substantiate the link between physical attractiveness and psychological health (Pertschuk & Whitaker, 1987).

Clinical Studies of Patient with Craniofacial Disfigurement: Aetiological Variations

Since the 1960s, tremendous progress has been made in the surgical treatment of craniofacial anomalies. Today it is generally agreed that craniofacial surgery creates positive changes in patient appearance (Barden, 1988). Our study intends to explore the "craniofacially deformed" group as a whole in terms of psychological characteristics, as well as assess the psychological profiles of the different aetiological groups of craniofacial patients. We also wish to see if there are any changes in these profiles once reconstruction has been completed. It is thus important to examine the literature

according to the psychological variables of the group as a whole as well as the various aetiological divisions of craniofacial patients, and the effect of the variables on the rehabilitative process. In addition, it is important to look at changes in the psychological and psychosocial dimensions after reconstructive surgery. While the clinical populations are divided on the basis of aetiology, it is important to keep in mind that rehabilitation may take similar forms primarily in terms of surgical intervention. There is, therefore, substantial overlap in the literature.

The primary source of information on craniofacial patient psychological variables is derived from medical literature. This literature tends to favour the psychodynamic model of personality development rather than incorporating other psychological theories, which may limit its value in terms of drawing valid conclusions (Jensen, 1978). Other problems with the literature arise from lack of control groups, small sample sizes (in general), poor experimental design, and vague operational definitions in terms of measurement criteria (Kent, 1992). It is important to keep these issues in mind when interpreting the literature and the often divergent or conflicting results and conclusions that are found by different authors.

Elective Cosmetic Surgery

Surgery is a high-stakes stressor with possible consequences that can include death and pain. Ineffective management of psychological complications of surgery can have profound effects such as delayed recuperative time, delayed return to work, poor

patient compliance, dissatisfaction with the surgical outcomes, hostility towards the surgeons, and anxiety (Borah, Rankin, & Wey, 2000). Borah and his colleagues (2000) questioned 281 plastic surgeons about post-operative complications of cosmetic surgery for their patients. Psychological problems (rather than physical problems such as infection or hematomas) were the most prevalent problems among the surgeons' patient caseloads. The patient complications included: anxiety (95.4% of sample), disappointment (96.8%), depression (95.0%), and sleep disorders (88.5%). Though this study is primarily anecdotal and retrospective, which may result in over reporting of some of these problems, these authors conclude that patients with pre-existing psychological conditions are a higher risk for postoperative psychological complications.

It is for these reasons that research has been done in the area of cosmetic surgery and the development of psychological screening tools. While the patient sample of the current study differs from the elective surgery population (as will be described below), the cosmetic surgery research is relevant in that it focuses on the need to develop psychological screening tools that can aid in the rehabilitative process for people that require facial reconstruction.

Not surprisingly, the physical changes that elective cosmetic patients seek are typically a means to psychological goals. Individual objectives vary, but often share an origin in recurrent painful feelings, thought, or experiences (Grossbart & Sarwer, 1999). Surgical goals include: changes in emotional states or cognitions; improvement in interpersonal relationships; and altering reactions of the larger society. While these may

be valid reasons for receiving surgical treatment, research has found that the goals and expectations of many elective cosmetic surgery patients may be distorted or inappropriate, resulting in anger and disappointment (Grossbart & Sarwer, 1999).

Grossbart and Sarwer (1999) note that psychological studies of cosmetic surgery patients have been designed primarily to establish a profile of patients seeking this treatment, as well as the development of specialized screening tools that will help a wide range of patients achieve successful surgical outcomes. Napolean (1993) described the use of pre-operative psychological measures in screening elective cosmetic surgery patients. Understanding the psychological motivations and profiles is considered essential in helping health care professionals prepare individuals for optimal post-operative experiences and outcomes (Maksud & Anderson, 1995).

Psychologists can contribute to plastic surgery practice during every stage of the process, from presurgical assessment, perisurgical management, and postsurgical adjustment (Deaton & Langman, 1986). One factor thought to play a major role in patient recovery, as previously noted, is the patient's pre-treatment expectations of surgical outcomes (Jensen, 1978). High or idealistic expectations were often the basis for disappointment after surgery. Unrealistic expectations are often related to the degree of beauty and the hoped for consequent impact on social relationships (Milke, 1999; Mcgregor, 1998; Ishigooka et al., 1998). When there are extremely high, or even moderate, expectations that are unrealized, post-operative depression is common (Napolean, 1993). Deaton and Langman (1986) suggest that post-surgical levels of

depression may be more reflective of combined expectations and pre-surgical levels of depression that deviate from the norm.

Expectations also play a role in the rehabilitation of patients undergoing oral and maxillofacial surgery for many of the same reasons. Expectations also influence coping strategies utilized by patients when undergoing cosmetic surgery (Kiyak, Vitano, & Crinean, 1998). Those patients that anticipated fewer problems (avoidant-copers), reported better psychosocial outcomes than those who anticipated numerous problems (vigilant-copers). Kiyak and his colleagues suggest that vigilant copers had heightened anxiety prior to surgery contributing to the self-fulfilling prophecy.

Elective cosmetic surgery patients differ from craniofacial patients on a number of variables. A demographic study of patients seeking elective cosmetic surgery showed 47.7% to have mental disorders according to the ICD-10 including: depressive, neurotic, hypochondriac, paranoid, and histrionic personalities (Ishigooka, Iwao, Suzuki, Fukuyama, Murasaki, & Miura, 1998). Another study found a higher rate of Body Dysmorphic Disorder (BDD) among this type of population (Sarwer, Wadden, Pertschuk, & Whitaker, 1998; Sarwer, 1997). Napolean (1993) indicated that there are certain personality types that are known to be more likely to be dissatisfied with the outcomes of cosmetic surgery and interfere with their own rehabilitation. The three most commonly described personality types that account for the majority of dissatisfied cases and litigation are Narcissistic, Borderline, and Obsessive-Compulsive Personalities (Napolean 1993; Dunofsky, 1997).

There is also a substantial body of elective plastic surgery literature that describes the positive impact of surgery on psychological and social functioning, when there is no extreme presurgical pathology. Patients often attribute positive changes in their lives to changes made to their facial appearance (Deaton, & Langman, 1986; Napolean 1993). Jensen (1978) found, in a meta-analytic review of the literature, that patients attribute increases in self-esteem, happiness, self-confidence, social confidence, and personal comfort to changes in their physical appearance. In several elective plastic surgery studies, as well as several craniofacial surgery studies, patients reported that their personalities changed positively due to changes in their facial appearance (Jensen, 1978; Napolean, 1993).

Screening tools are intended to uncover pathologies, whether extreme or mild, so those treatment regimes that would be most effective in reducing preoperative psychological complications can be carried out. It is necessary to find a tool that would elucidate the psychological or psychosocial signs that reduce postoperative recovery for all aetiological groups of craniofacial patients. In order to do so, the unique psychological characteristics, as well as shared features, of each aetiological group needs to be reviewed.

Craniofacial Disfigurements: Aetiology and Psychological Responses

When discussing craniofacial rehabilitation such as the use of osseointegrated implants and prostheses or autogenous reconstruction, it is important to keep in mind that patients with the most severe forms of craniofacial deformity will likely never be

reconstructed to the point of having "normal" faces (Pruzinsky, 1992). It is fair to say that although some craniofacial deformities can be eliminated through surgery, most are only reduced, leaving the patients with residual disfigurement (Pertschuk, 1990). Surgical intervention does not guarantee a normal face but rather a transformation from less presentable to more presentable and socially acceptable (Macgregor, 1990).

When consulting with patients that are going to receive rehabilitative surgery, the reality of the outcomes must be conveyed so that the discrepancy between expectations and reality are reduced thus improving the recovery process (Pruzinsky, 1992). To communicate appropriately, the clinician needs to have an understanding of the what craniofacial patients are bringing, in terms of psychology, to the surgical process. Now that it is possible to provide radical reconstruction to more severe deformities, due to advances in surgical techniques (Tessier, 1972; Tanzer, 1978; Branemark, 1985), surgeons and other health care workers have become sensitized to the array and severity of psychological and psychosocial problems that craniofacial patients have had to cope with. Most research in this area has its primary purpose in providing service and to assess psychological status and prognosis for craniofacial patients (Macgregor, 1990).

While craniofacially disfigured people are not necessarily expected to suffer from -or with the same frequency- the more severe pathologies that the elective cosmetic surgery patients do, there is still a recognized concern that they are at risk for psychological and psychosocial distress. When compared to elective cosmetic surgery patients, it has been found that patients with craniofacial disfigurement that are going to undergo rehabilitative surgery have fewer emotional problems and more realistic

expectations of treatment outcomes (Jensen, 1978). Still, as the literature above noted, distress and psychological problems can impede the rehabilitation and recovery processes.

Interest has also developed in the kinds of research that are specific in their focus such as shedding light on the effects of surgery on patients with different aetiologies and the psychological changes from presurgical assessment. The knowledge in these areas is still sparse and uneven in scope and depth, but is still valuable.

Facial reconstruction or maxillofacial prosthetic restoration brings about responses in a whole person (Sela & Lowenthal, 1980). Sela and Lowenthal (1980) found that 33 of 39 craniofacial patients responded favourably to surgery. Results depended, according to these authors, on the aetiological basis of defect rather than age, sex, or ethnic background. Trauma patients reacted most positively, congenital patients reacted moderately positively to surgery, while neoplastic patients reacted least favourably. These authors consider the statistically significant differences to be a direct result of the psychological natures of the three pathologic categories, but were unable to provide information as to how these aetiological categories differed in terms of psychological dimensions.

Congenital or Childhood Acquired Facial Deformity:

Numerous studies have documented the psychosocial problems associated with congenital facial defects such as cleft-lip and palate. Those with clefts have been reported to have lower self-concepts and a lower quality of life than those who have no

experience with facial anomalies (Broder & Strauss, 1989; Sarwer et al., 1999). In addition, they are considered to have lower self-esteem, impaired relationships, and higher dependence on their families (Pillemar & Cook, 1989). Unfortunately, as Bennett and Stanton (1993) reported, there is little psychological support available for those who grow up and live with congenital deformities.

Pertschuk and Whitaker (1987) stated that for those born with craniofacial defects, their plight involves negative social expectations, and treatment leading to impaired social behaviour and self-concept. Tobiasen (1984) also described negative expectations and treatment of people with congenital facial deformities. Further consequences of congenital craniofacial defects were outlined by Krueckeberg and Kapp-Simon (1997), whose longitudinal study of congenital craniofacially disfigured children found 31% to receive global behaviour problem scores in the clinical range from either teacher or parent reports. Richman (1998) examined behavioural inhibition in cleft children and found 23% of 300 children ages 7 to 12 demonstrating clinically significant social inhibition based on parent report. A possible explanation for increased social withdrawal and behavioural inhibition in children with facial disfigurement is that social withdrawal represents a self-protective pattern to minimize peer rejection (Endriga & Kapp-Simon, 1999).

Craniofacial surgery is a development of the last three decades, and only within the last decade have there been multiple centres performing these procedures. This has meant that a number of individuals have grown up with major craniofacial deformities and have had reconstructive surgery done comparatively later in life (Pertschuk &

Whitaker, 1987; Sarwer et al., 1999). Reconstructive surgery is now performed at earlier ages, but it is still this population of older patients who have had to live with craniofacial disfigurement throughout a large part of their life. It is this group that most clearly demonstrates the psychological and psychosocial consequences of an uncorrected deformity. They may also give some indication of possible long-range psychological consequences for patients whose deformities do not permit correction to a relatively normal appearance (Pertschuk & Whitaker, 1987). Pertschuk and Whitaker (1987; 1988) found higher rates of social adjustment problems, lower self-concept, depression, and anxiety among children with more extensive disfigurement (when compared to children who displayed more subtle limitations), which was confirmed in the study done by Sarwer and his colleagues (1999). These authors concluded that while most patients who have a congenital deformity, or acquired their deformity early in life, had a relatively high degree of proficiency in day-to-day functioning, they are at a distinct psychological disadvantage when compared to the general population.

Trauma-Based Facial Disfigurement:

Sustaining a facial injury is often a psychological trauma to the victim. Ye (1998) found complex problems in trauma patients (primarily facial burns), with 80% of his sample displaying anxiety, and 95% displaying problems such as depression, social withdrawal, loss of self-esteem, pessimism, and suicidal ideation. Pertschuk and Whitaker (1987) examined the pre-operative psychological status of patients with craniofacial defects due to trauma (primarily motor vehicle accidents). They found

evidence of psychological and social difficulties, with depression as the most common problem, followed by difficulties with social adjustment and identity concerns. Menzies (2000) found similar problems among burn patients, as well as fears of rejection, and lower self-esteem.

It appears that even long after the initial traumatic event, persistent fear, depression, avoidance, and body image changes can result in substantial impairment in personal and social functioning in both burn and other trauma patients (Rusch, 1998). Research, overall, indicates that long-term effects of trauma to the face, such as burns, include sufficient psychological disturbance to require specialized psychological treatment in approximately 40% of patients (Wallace & Lees, 1998; Pruzinsky, Rice, Himel, Morgan, & Edlich, 1992). Psychopathology can also vary over time, with periods of remission followed by exacerbation during times of stress (Kleve & Robinson). As McEleny (1992) stated, these patients must cope with the death of their face and a violent adjustment to a new self image. Often patients will withdraw socially (Blumefield & Reddish, 1987).

Consistent with previous research Kleve and Robinson (1999) found that in 71 burn-injured adults time since injury did not correlate with degree of emotional difficulty experienced. Even after living with the injury, 56% of the sample reported emotional problems and 38% felt that they would benefit from professional help. Similar results were found in the study done by Wallace and Lees (1988). Gilboa and her colleagues (1999) found that for those burn patients (61 participants), the ability to cope with trauma is strongly related to specific personality traits. As predicted, they

found that successful coping was found to be positively related to personality dimensions of extroversion and optimism, and negatively related to neuroticism and social anxiety, when using the Satisfaction With Life Scale, and the General Health Questionnaire.

Pertschuk and Whitaker (1987) expressed the need for plastic surgeons who will perform reconstructive surgery on facial trauma patients, to be aware that this is a high-risk group from a psychiatric standpoint, and be prepared to offer psychiatric or psychological assistance to these patients. Ye (1998) stated that correction of disfigurement is an indispensable treatment to ameliorate psychological problems. For the 18 of 115 patients who received surgical treatment (reconstruction), all showed a marked improvement in terms of psychological factors. Other authors suggest that prior to, and after surgical intervention, health care professionals should reinforce personality traits of extroversion, hope, and optimism and attempt to diminish features of neurosis or social anxiety (Gilboa et al., 1999). It is of paramount importance to identify and treat facial trauma patients with psychological problems that may interfere with the rehabilitative process, through psychological screening or assessment (Pruzinsky et al., 1992). Diller (1988) and Pertschuk (1992) suggest that the specific areas to focus on for these patients are: personality factors; disorders such as depression, anxiety, post traumatic stress disorder; and interpersonal factors such as social support.

Head and Neck Disfigurement Due to Neoplasia:

The diagnosis and treatment of any cancer is frightening for patients and their

families. Head or neck cancer treatment affects many vital functions such as

mastication, swallowing, speaking, and appearance, both before and after treatment.

Pain is also frequently reported. It is for this reason that head and neck cancer has been

described as a psychologically highly traumatic cancer type (Boer, McCormick, Pruyn,

Ryckman, & van den Borne, 1999). Patients with head and neck cancer may either have

disfigurement extraorally or intraorally.

Although improvement in surgical reconstruction skills and functional and

cosmetic outcomes have occurred, the 5-year survival rate is only at 50% (Coebergh, van

der Heijen, & Janssen-Heijen, 1995). Despite the devastating long term prognosis, one

of the major concerns reported by patients with head and neck cancer is the

disfigurement associated with the disease and subsequent treatment. In a study by

Gamba, Romano, and Grosso (1992), 45% of patients reported self-image was the most

important change after their surgery. Those with extensive disfigurement tended to

isolate themselves from family and friends (Dhooper, 1985). Disturbances in

psychosocial functioning and psychological distress are reported by a considerable

number of patients: worry, anxiety, mood disorder, fatigue, and depression are the main

symptoms (De Boer et al., 1999; Green, 1994; Maguire1992).

The type of treatment and perception of care received can have a significant

effect on the speed of recovery, pain associated with recovery, and extent of

disfigurement. De Boer found that friends, family, professional caregivers, and fellow

patients have been identified as potential sources of social support that can help in the rehabilitative process (de Boer, Pruyn, & van der Borne, 1995). He found that open discussions of illness, social support, and adequate information from specialists were predictors of positive rehabilitation outcomes in patients with head and neck cancer.

Little is known about the rehabilitative outcomes over time. According to some studies, the longer time since treatment, the fewer psychosocial symptoms the patients had and the better the quality of life (De Boer et al., 1995; Gamba et al., 1992). Most physical problems related to the disease decreased over time, but psychological problems sometimes get worse, attributed to patient burnout and lack of coping skills (Rapoprt, Kreitler, & Chaitchik, 1993). Espie and his associates (1989) could not find any decrease in psychological distress based on time elapsed since the surgery. There are indications that certain factors such as coping strategies and use of a well-functioning prosthesis have a positive impact on rehabilitation outcomes (De Boer et al., 1999). Factors that clearly have a positive influence on rehabilitation results and psychosocial outcomes are information and support according to De Boer (1995; 1999).

The diffuse nature of the conclusions in literature regarding psychosocial correlates of head and neck cancer patients makes it difficult to establish the precise nature of what this sub-population of craniofacial patients brings to their reconstructive surgery and rehabilitative process. Their psychological functioning is threatened by physical impairment, stress within the family, adjustment and adaptation to initial loss and reconstruction, fear of facial mutilation, and the possibility of death (David &

Barritt, 1982; Sherman, Simonton, Adams, Vural, Owens, & Hanna, 2000). How these variables interact is poorly understood.

Hearing Impaired Patients: A Unique Aetiological Group

The patient population at COMPRU includes those that receive Bone-Anchored Hearing Aids for conductive hearing loss. While some of these patients have deformed ears such as those with microtias or atresias (lack of development of external ear canal), the primary reason for seeking treatment at COMPRU is to improve hearing. It is therefore necessary to review the literature related to the effect of hearing impairment on people's interpersonal and intrapersonal psychological characteristics.

Much of the literature on hearing impairment is focused on those that are deaf and have sensorineural damage. To understand the effects of partial hearing on a person's psychology, inferences have to be drawn from literature that discuss progressive hearing loss, usually in ageing populations. This is not an ideal situation as many of the patients at COMPRU have partial loss, combined sensorineural and conductive loss, or unilateral conductive loss.

Many older persons with hearing loss experience pronounced modifications in relationships and interpersonal functioning as a result of the hearing loss (Smith & Kampfe, 1997). These problems include: isolation, decreased recreational outlets, anxiety, distrust, depression, and problems with others treating them as though they have cognitive deficits. Luterman (1997) also found a loss of self-esteem. Similar problems were found in patients with progressive levels of hearing loss, with increased problems

at higher levels of hearing impairment (Strawbridge, Wallhagen, Shema, & Kaplan, 2000).

Many people with hearing loss use hearing aids to reduce some of the problems associated with lack of hearing. Unfortunately, of those with amplification devices, about one-third stop using it, according to Popelka, Cruickshanks, and Wiley (1998) study of 1,629 adults with hearing problems. One explanation for this is that patients often function under the misperception that hearing aids will restore their original hearing sensitivity. The reality of the hearing aid and its poor functional properties when there is background noise is highly frustrating and affects compliance.

When an individual has conductive hearing loss, the sensorineural fibres are intact but there is a problem in conducting the sound to these fibres usually due to problems with the inner ear equipment or anything that blocks the ear canal (House, 1997). The titanium abutment of the bone-anchored hearing aid is implanted in the mastoid process and is intended to bypass the dampening effects of the inner ear. The sound is transmitted in closer proximity to the sensorineural fibres, thus improving hearing dramatically (Tjellestrom & Hakansson, 1995). It is considered advantageous to conventional bone-conduction aids that rest behind the ear but on top of tissue and bone (Snik, Mylanus, & Cremers, 1995). Conventional aids are considered uncomfortable by many users resulting is poor compliance (Meyers, 2000), while BAHAs result in the opposite behaviours (van der Pouw, Snik, & Cremers, 1999). For those that use hearing aids that are inserted into the ear, problems are similar in that the pathway through which sound is being amplified and transmitted is of high resistance, resulting in poor

conduction. In addition, the conventional hearing aids can cause pain and exacerbate

problems by causing increased wax build-up, infections, or fluid build-up (Mylanus, van

der Pouw, Snik, & Cremers, 1998; Popelka, Cruickshanks, & Wiley, 1998). The BAHA

is considered by many to be a safe and effective bone-conduction hearing aid that

improves the quality of life in the patients that receive it (van der Pouw, Snik, &

Cremers, 1998; Wazen, Caruso, & Tjellestrom, 1998).

Post-Operative Responses to Intraoral Surgical Rehabilitation and Prosthetics

Advances in biocompatability and retention research related to osseointegrative

implants have allowed for the use of this technology, initiated by Branemark (1964) in

facial prosthetic restoration (Wilkes & Wolfaardt, 1994). Osseointegrated implants

represent a viable alternative when autogenous reconstruction is not possible. The

ability of pure titanium, when placed in the bone, to retain load-bearing superstructures

has improved the quality of life of patients that must seek this form of treatment for

facial disfigurement. Whereas earlier prosthetic reconstruction has not generally been

satisfactory due to aesthetic acceptability, functional performance, and retention, the

new techniques of osseointegration have allowed the patients to incorporate the

prosthesis into their sense of self (McComb, 1993; Wilkes, Wolfaardt, 1994) rather than

a foreign body.

The primary source of information available on the psychological reaction to

osseointegrated prostheses is derived from studies on intraoral defects such as

orthgnathic, maxillofacial, and dental disfigurement. Many of these studies argue that

the loss of teeth or jaw structure can be as psychologically devastating as external facial

deformity. Several suggest that osseointegrated implants result in a substantial

improvement in patient's well-being due to restoration of function and aesthetic

properties (Blomberg & Lindquist, 1983; Kent & Johns, 1991). Kent's (1992) review of

literature applicable to osseointegrated implants in endentulous patients found that hope

for improvement in appearance is an important issue for those that seeks the implants.

A study of the effects of maxillofacial prostheses in 39 patients revealed that the

prosthetics had an overall positive impact on 33 of 39 patients (Lowenthal, 1980). The

prostheses were found to raise self-esteem according to the response patterns on a

25-item "sickness questionnaire." In a retroactive study employing a non-standardized

questionnaire, comparing patient's experiences with conventional dentures versus

osseointegrated implants, Grosso and his colleagues (1989) found improvements in the

implant patient's ability to speak, confidence, interpersonal interactions, feeling about

self, and happiness, when compared to the denture group.

Kent and Johns used a standardized instrument (the General Health

Questionnaire) in their (1991) study and reported that those who received

osseointegrated dental implants had significantly lower post-treatment levels of distress

compared to controls. This data was further supported by their follow-up study of a

comparison of conventional denture replacement patients (Kent & Johns, 1994). The

authors found that like the osseointegrated implant group, the denture group had higher

than normal pre-treatment levels of stress, but unlike the osseointegrated group, their

levels of distress did not decline after treatment. These findings were also supported by

Rogers, McNalley, Mahmoud, Chan, and Humpris's study (1999) that reported improved

psychological responses in endentulous patients that received osseointegrated implants.

Kent and Johns (1993) concluded that, overall, that prosthetic treatment for

endentulism, rather than conventional treatment improved psychological status. They

attributed this difference due to the properties of the implants that were more stable and

easier to incorporate into the patient's sense of self. These conclusions were supported

by Blomberg (1985; 1991) who stated that endentulous patients often suffer intense

psychological distress due to the removable nature of the dentures. Psychological

problems included psychosocial impairment, avoidance, and contact problems.

Blomberg noted that many patients with osseointegrated prosthetics after a period of

time were able to incorporate the prosthesis into their self-image and were no longer

conscious of it (Blomberg, 1985).

Albrektsson, Blomberg, Branemark, and Carlsson (1987) found that among 189

patients surveyed, 80% reported improvements in their intrapsychic health due to

implanted prostheses. This study also indicated a substantial and long-term

improvement in self-esteem and self-security. Baily and Edwards (1975) cautioned that

unrealistic expectations can complicate the acceptance of every prosthesis. They urge

those that are providing rehabilitative treatment with maxillofacial prosthetics carefully

consider patient's self-perceptions, emotional stability, personality characteristics, and

social circumstances, which appear to be salient features when dealing with these types

of defects and the recovery process.

Kiyak and associated (1990) also found a dramatic reduction in problems associated with facial physical appearance and socialization with others in their group of osseointegrated dental implant patients, when compared to pre-treatment measures. This study also found a correlation between high scores in neuroticism on the Eysenck's Personality Inventory and post-operative problems with social functioning. Other personality variables were found to be stable when measured pre- and post-operatively, which are similar to the results found in Blomberg and Lindquist's (1983) study. Kiyak and his colleagues concluded that neuroticism, anxiety, and other psychological states should be considered when screening patients that will receive implants. If there are problems, they should be dealt with appropriately so that a successful outcome can be achieved (Kiyak, Beach, Worthington, Taylor, Boleander, & Evans, 1990).

While the results of many of these studies are encouraging, it is important to keep in mind that there are many methodological problems with the studies. Macgregor (1982) notes that there is a general lack of longitudinal studies, and often an unsystematic approach to the studies done thus far. Kent's (1992) review also noted several concerns with methodology such as limitations in drawing firm conclusions from retrospective studies, frequent use of non-standardized test instruments, lack of control groups, and response bias.

Stephanson's (1994) study, which our study is an extension of, must be discussed. This study is important because it attempts to study several aetiological groups that receive surgical treatment for craniofacial deformities. Fourty-six patients undergoing treatment for craniofacial deformity at the COMPRU facility were assessed

pre-surgically. Significant differences in interpersonal problems, persecutory ideation, anxiety, impulse expression, and deviation were found between the aetiological groups he evaluated (Congenital, Neoplastic, Trauma, BAHA) using the Basic Personality Inventory and Campbell's Scale of Well-Being. The Congenital group was found to have the highest BPI scores while the BAHA group had the lowest (higher scores indicate more severe pathology). The post-surgical (post-treatment) sample consisting of 15 people indicated that there were reductions in measurements of anxiety, self depreciation, depression, and denial. Patients also experienced significant increases on measures of satisfaction with life and well-being. The results overall, suggest that rehabilitation of craniofacial deformities with osseointegrated prostheses has positive effects on several dimensions of psychological and psychosocial health and well-being. This study, though valuable, suffers methodologically from lack of controls, uncontrolled timing of questionnaire administration, and small sample size.

The Basic Personality Inventory

The Basic Personality Inventory (BPI) is a standardized questionnaire designed to measure personality and psychopathology and yield information that would be helpful to both psychologists and other professionals in a wide variety of settings (Jackson, 1996). It has norms based on samples of North American adolescents and adults of both genders. There is also information available for special deviant populations such as psychiatric patients (eating disorders, alcoholism), criminal populations, and some medical patient groups (chronic renal failure, fibrositis and pain management). Hoffman

and Jackson (1988) found that the instrument was sensitive to changes brought about by treatment for alcoholics using pre- and post-test measures.

Jackson had several aims when developing the BPI (1989). This instrument is intended to create a fairly short profile measure of major constructs of psychopathology that would render it useful for screening, assessment, and research. It also was developed so that it would be capable of yielding reliable discrimination among persons displaying different patterns of dysfunction within both the normal and pathological ranges. It also attempts to employ dimensions that refer to relatively homogeneous behavioural characteristics that vary systematically in the general population and within deviant groups. The construction of the BPI also employed modern methods and standards for test construction. (Jackson, 1996)

The Basic Personality Inventory has 12 scales that can be categorized into logical families. The scales that evaluate measures of inadequate or deviant socialization and impulse control are: Interpersonal Problems (IPs), Alienation (Aln), and Impulse Expression (ImE). Mood and personal/emotional adjustment are measured by the Depression (Dep), Anxiety (Anx), and Hypochondriasis (Hyp) scales. Cognitive functioning is indicated by the Persecutory Ideas (PId) and Thinking Disorders (ThD) scales. Measures of self-perception and sociability are found within the Self Depreciation (SDp) and Social Introversion (SoI) Scales. The Deviation scale is a measure of critical deviant behaviours, while the Denial (Den) scale evaluates test-taking style.

The BPI can also be divided into logical families of psychometric characteristics. Studies comparing responses on both the MMPI and BPI show that 96% of the variation shared by these two scales can be accounted for by five factors (Skinner & Jackson, 1975; Jackson, 1989). These factors are defined as: Inadequate Impulse Control (ImE, IPs, Anx, Aln, Den); General Social Anxiety (Anx); Depression and Somatization (Hyp, Dep), Psychotic Processes (PId, ThD, Aln, Dev); and Depressed Withdrawal (SoI, Sdp, Dep, Aln) (Jackson, 1989, p.65).

The Basic Personality Inventory is sensitive to changes brought about by treatment, it has excellent psychometric properties, is appropriately standardized, and has discriminative ability in terms of assessing personality dimensions. Given these properties, the use of the BPI in our patient population to analyse psychological dimensions and factors is justified.

Final Remarks

The review of the literature supports the idea that successful rehabilitation of deformity or injury is highly affected by psychological variables. Appearance is a significant contributor to overall well-being and self-concept development. For the facially disfigured, the type of injury and the social implications of having a visible deformity can cause significant stress. Restoration of some of the aesthetic properties of the face and attaining a degree of normalcy is assumed (and usually supported) to positively affect the psychological and social situations of these patients. While the literature is sparse and divided amongst different fields, a common underlying theme emerges. To aid the rehabilitative process and ensure patient satisfaction and recovery,

some type of screening procedure for psychological deviations should occur. In addition

to understanding craniofacial patients as a whole, and as aetiological sub-populations,

screening patients can assist in understanding their individual characteristics that could

be useful when devising an individualized treatment plan. If pre-surgical intervention

that aids in alleviating psychological distress can be offered on the basis of the

information found through screening, it is highly likely that it will be beneficial to the

patient.

Chapter 3 Design and Methodology

A. Research Design

This study is an extension of the work done by Stephanson (1994). Almost all

characteristics of the methodology are the same, with some variation in the

administration of the questionnaires and permutations due to the increased sample size.

The instrumentation and most data analyses are the similar in this study to those

originally outlined by Stephanson. This study differs in that there is a third section that

evaluates a group of post-operative patients that have completed a second post-operative

questionnaire. The characteristics of the sample are similar, except that the pre-operative

sample for this study consists of 207 people (versus 46 in Stephanson's study) and the

post-operative sample in this study is 88 (versus 15). The second post-operative sample

consists of 42 patients.

The initial part of this study is descriptive in nature, following a

causal-comparative research design. It may also be called an ex post facto design.

According to Lehmann and Mehrens, in Juergens (1979), descriptive research of this type

"is primarily concerned with determining the nature and degree of existing conditions"

(p. 47). It does not involve making predictions or drawing causal inferences, but rather

examines the different scores on the Basic Personality Index and Campbell's Sense of

Well-Being scale, among the different aetiological groups that are involved with

COMPRU but have not yet received treatment. Results of the questionnaires were

analysed and compared to the norm populations that had been used to establish reliability

and validity of the instruments. Results from the various subgroups were also analysed to

B. Sample and Population

Original Pre-Operative Sample

Subjects for this study were a group of patients that had been classified, by COMPRU, as being considered for treatment. To meet the criteria for becoming a patient at COMPRU, the patient was analysed using a protocol established by the facility. Depending on the medical problem, either the COMPRU Osseointegration BPQM Manual or BAHA Quality Manual was used by members of the team at this facility. Due to the specialized nature of the subject population, and limited number of patients in some of the aetiological groups, selection was not randomized and no formal control group was established.

The initial part of the current study, which is the description of the whole sample of craniofacial patients, as well as the aetiological groups, and comparison to BPI norms, involved patients who were considered for one of several treatment programs offered by COMPRU. This initial population included patients that later completed treatment, declined treatment, or were referred to an alternative type of treatment, if deemed appropriate. Of the 211 assessed for this study 120 completed the pre-test but had not yet received surgery or did not continue with COMPRU. The individuals that correctly completed the questionnaire had demographic characteristics consistent with the normative comparison group. Four subjects' results were rejected due to incorrect completion of the instruments. The remaining 207 patients consisted of 110 males (53.1%) and 97 females (52.2%). Tables 3.1 illustrates the demographic characteristics

of the initial patient (pre-operative) sample according to gender and age, which are the

variables that Jackson (1989) based his normative group on.

Table 3.1

Demographic Characteristics of the Initial Study Sample (N = 207): Age and Gender

Characteristic	Frequency	Percentage
Gender		
Male	110	53.1
Female	97	46.9
Age (years)		
11-18	9	4.3
19-26	18	8.7
27-34	27	13.0
35-42	27	13.0
43-50	36	17.4
51-58	35	16.9
59-66	24	11.6
67-85	31	15.0

The patients evaluated varied according to aetiology. The defects included:

congenital damage, traumatic injuries (e.g. accidents, burns, etc.), malignant cancers, and

conductive hearing loss (i.e.damage to inner ear structures). The patient sample was then

grouped according to their aetiological basis into Congenital, Neoplastic, Trauma,

BAHA, and Other (consists of people with more than one anatomical area and those that

receive both alloplastic and autogenous reconstruction together). The patients in this

study were also grouped according to the treatment that was required. These groups are:

Autogenous Reconstruction (AR); Craniofacial Osseointegration- Extraoral; Craniofacial Osseointegration- Intraoral; Bone-Anchored Hearing Aid (BAHA); and Other (more complex treatment requirements). Table 3.2 provides the diagnostic characteristics of the pre-operative sample.

Table 3.2

Diagnostic Characteristics of Pre-Operative Sample (n=207)

Characteristic	Frequency	Percentage
Aetiology		
Congenital	21	10.1
Neoplastic	49	23.7
Trauma	27	13.0
BAHA	103	49.8
Other	7	3.4
Treatment		
Autogenous	18	8.7
Extraoral	46	22.2
Intraoral	24	11.6
BAHA	103	49.8
Other	16	7.7

Pre-Post Operative Sample and Post-Post Operative Sample

The pre-post operative sample consists of the patients that completed a post-operative questionnaire in addition to the pre-operative one. At the time that this set

of data was collated 88 of the 207 original patients had completed their surgical

treatment. The majority of these patients completed the questionnaires, at the COMPRU

facility, shortly after the final stages of their treatment. The post-post operative sample

consists of 42 patients that completed a pre-operative questionnaire and two post

operative (post-post) questionnaires Table 3.3 illustrates the demographic characteristics

of the Pre-Post and Post-Post Operative samples.

Table 3.3

Demographic Characteristics of the Pre-Post Operative Sample (N = 88) and Post-Post

Operative (N = 42) Sample: Gender and Age

	Frequency		Percentage		
Characteristic	Pre-Post	Post-Post	Pre-Post	Post-Post	
Gender	46	23	52.3	54.8	
Male	46	23	53.2	54.8	
Female	42	19	47.7	45.2	
Age (years)					
11-18	1	0	1.1	0.0	
19-26	5	2	5.7	4.8	
27-34	11	5	12.5	11.9	
35-42	7	4	8.0	9.5	
43-50	23	14	26.1	33.3	
51-58	14	7	15.9	16.7	
59-66	12	5	13.6	11.9	
67-85	15	5	17.0	11.9	

Again, the patients in the pre-post sample and post-post sample can be categorized on the

basis of aetiology and treatment type. The categories are presented in Table 3.4.

Table 3.4

Diagnostic Characteristics of the Pre-Post Operative Sample (N=88) and Post-Post

Operative Sample (N= 42)

	Frequency		Percentage	
Characteristic	Pre-Post	Post-Post	Pre-Post	Post-Post
Aetiology				
Congenital	7	6	8.0	14.3
Neoplastic	17	8	19.3	19.0
Trauma	13	6	14.8	14.3
BAHA	46	18	52.3	42.9
Other	5	4	5.7	9.5
Treatment				
Autogenous	1	0	1.1	0.0
Extraoral	25	15	28.4	35.7
Intraoral	8	4	9.1	9.5
BAHA	46	18	52.3	42.9
Other	8	5	9.0	11.9

This study was conducted over a wide time frame and the periods between

rehabilitative stages and completion of questionnaires was not controlled for. The time

between completing the pre-operational questionnaire and surgery varied, as did the time

between surgery and prosthesis fitting and the post-operative completion of the

questionnaires. The average time period between the pre-operative measures and the

operative date was 193 days (SD=480; range: 0 to 3432 days). The average time between

the operative date and the first post-operative assessment was 655 days (SD=558 days;

range: 11 to 2232 days). The average time between the surgical intervention and the

second post-operative completion of the questionnaires was 1232 days (SD=810 days;

range: 272 to 3772 days).

C. Procedure- Administration and Instrumentation

<u>Administration</u>

Patients that were considered for treatment with the COMPRU program

completed a battery of psychological instruments. This was, and still is, presented as part

of the ongoing treatment process. Patients were presented with the battery and an

explanation that these tools are part of an exercise to help them in the recovery process.

Patients are also told, by the individual administering the battery, that performance on

the questionnaires would not necessarily affect their chances for inclusion in the

COMPRU program. From October 25, 1989 to April 25, 1994, 60 candidates completed

the battery at the Education Clinic in the University of Alberta. The questionnaires were

administered individually by one of three researchers at the Clinic, with the majority

administered by Stephanson (1994). From April 25, 1994 to March 6, 2001, the

questionnaires were administered by COMPRU staff member as described above. The

questionnaires were then hand-scored and entered into two computer databases (SPSS

and Excel) by research assistants at the University of Alberta Clinic. A total of 211

patients completed the pre-operative questionnaires since October 25, 1989. From the

pre-opertaive sample, 88 patients who underwent rehabilitative care (surgery and

recovery) completed the second set of questionnaires (post-operatively). Again, the majority of the sample completed the battery at the COMPRU facility.

Questionnaires Administered

The patients were asked to complete a package of six psychometric inventories pre-operatively and post-operatively (after recovery was complete). The package (battery) included a demographic questionnaire (Appendix A); the Self-Efficacy Measure; Wallston's Health Locus of Control; Campbell's Sense of Well-Being Scale; the Sickness Impact Profile; and the Basic Personality Inventory. This study is focused on the patients' psychological and psychosocial qualities. The most appropriate tools for the evaluation of these aspects of the individuals who completed the questionnaires are the Basic Personality Inventory (BPI) and the Campbell's Sense of Well-Being Scale. The data collected from these were statistically analysed.

1. Demographic Questionnaire: During both stages of contact (pre-operative and post-opratively), the patients completed a demographic questionnaire. The information requested included: current date, date of birth, occupation, marital status, work status, address, and telephone numbers.

2. The Basic Personality Inventory: The BPI was developed to provide psychologists and other professionals with a personality measurement device to assess a number of broad facets of personality psychopathology within the normal population and within populations of persons experiencing psychological distress (Jackson, 1996). The BPI is a 12 scale, 240 item true-false personality inventory, in pencil-and-paper format, intended to measure differentiated components of psychopathology (Jackson, 1996) and

is partially modelled after the Minnesota Multiphasic Personality Inventory (MMPI). It is considered to be psychometrically superior to the MMPI, easier to administer, contain more homogenous scales, and has a psychiatric predictability factor as good or better than the MMPI (Retzlaff & Bromley, 1991). The independent scales have each been established as internally consistent and valid measures, with reliability scores ranging from .61 to .88. The test-retest stability (reliability) ranges from .67 to .87 after a 1-month period (Holden, Helmes, Fekken, & Jackson, 1985; Kilduff, 1979). High measures of discrimination validity have been established by way of independent studies using clinical and normal populations and through comparisons with other well established measures (e.g. State-Trait Anxiety Inventory, Beck's Depression Inventory, MMPI).

The 12 scales refer to dimensions of personality that are considered important to an individual's psychological functioning, both intrapsychically and interpersonally. The Basic Personality Inventory is designed primarily to identify areas of personal maladjustment or psychopathology, but it can also be used to infer personal strengths and normal personality functioning. The scale definitions are bipolar in nature and thus indicate characteristics of both high and low scoring individuals.

The BPI is dimensional in nature, where personality characteristics are conceived as varying in some degree over a wide range. It is consistent with classical test theory (Lord & Novick, 1968), as well as modern conceptionms of functioning of personality characteristic (Jackson & Livesley, 1995; Widiger & Sanderson, 1995). Of the 12 scales, 11 were designed to measure psychological characteristics. These characteristics

include: Hypochondriasis (Hyp), Depression (Dep), Denial (Den), Interpersonal Problems (IPs), Alienation (Aln), Persecutory Ideas (PId), Anxiety (anx), Thinking Disorder (ThD), Impulse Expression (ImE), Social Introversion (SoI), and Self Depreciation (SDp) (Jackson, 1989). The twelfth scale, Deviation (Dev), was designed as a validity scale composed of critical items sensitive to infrequent and erratic responses. Individuals that score very high on this scale have either responded non-purposefully or present a number of serious symptoms.

The BPI is also sensitive to faking and motivated distortion (Helmes & Holden, 1986; Holden & Jackson, 1981). In the situation in which a person is attempting to make his or herself appear in a positive light (faking good), the BPI profile is characterized by a high T score (above 70) on the Denial scale and low scores on all other scales. When a person is trying to accentuate the dire state of his or her situation, the profile is characterized by high scores on all scales, particularly Deviation, and a lower score on the Denial scale. (Jackson, 1996)

3. <u>Campbell's Sense of Well-Being Scale:</u> The Campbell's Well-Being Scale is a nine-item instrument rating various dimensions of happiness on seven-point semantic differential rating scales (Campbell, 1976). This scale is not standardized and does not have validity or reliability data. It was chosen primarily because it is extremely short and measures patient's qualitative feelings of overall happiness and well-being in a quantitative way.

D. Data Analysis

Once the questionnaire were completed and collected, the Campbell's Scale of Well-Being and the Basic Personality Index were scored by hand and the results were then entered into two databases, SPSS 10.0 (Statistical; Program for the Social Sciences-Version 10.0) and Microsoft Excel. Once the data was completely entered it was checked for errors by randomly selecting 10% of the sample of original population from the database and comparing it to the original hand-written records. Only 3 mistakes in a possible 71, 12570 data entry and conversion points was found. The BPI scores were converted to T scores based on age- and gender-based norms (Jackson, 1989). The statistical analyses performed were: frequency distribution statistics for the demographic variables; one-way ANOVAs were performed for aetiological groups with age differences, Campbell's Scale of Well-Being, and BPI scales. For the post-treatment study, T-test analysis was performed for the repeated measures design. The post-post treatment study (when a second post-operative battery is administered) required a different statistical procedure consisting of repeated measures ANOVAs for the group as a whole. This part of the study lacked sufficient numbers of patients in each aetiological group so comparisons were not made between groups.

E. Methodological Assumptions and Limitations

There were several limitations due to the inability to control several aspects of this study. Working within a clinical setting where time is difficult to control for presents a problem and we are making an assumption regarding the relative stability of

the constructs we are measuring. This is special significance given that we did not control for time periods between completion of the questionnaires relative to surgery dates and in the acquisition of injury and disfigurement for the traumatic and neoplastic groups. We also have assumed that the samples we have obtained are representative of their respective groups, though the size of the BAHA group makes it less a subject of concern. The BPI conversion tables used to calculate the T scores for our sample were constructed using a wide normative sample. In using the BPI "normal" tables we are making the assumptions that the patient population in this study is represented by the normative population. In the post-operative sample the number of patients is very small for those who are grouped into the Autogenous, Intraoral, and Other units. Because of the small numbers of these groups when compared to the BAHA or Extraoral Osseointegrated groups we make the assumption that the smaller treatment groups do not differ from one another in a manner that is highly appreciable so as to affect the focus of our study.

F. Hypotheses

This study examines several statistical hypotheses as Stephanson's (1994) study. They are as follows:

Ho 1.1: In the pre-operational sample, scores on the BPI scales will reflect scores in the normative range.

Ho 2.1: There will be no significant differences between groups for any of the psychometric scales of the BPI.

Ho 2.2: There will be no significant differences between groups for measures of Inadequate Impulse Control (ImE, IPs, Anx, Aln, Den).

Ho 2.3: There will be no significant differences between groups for measures of General Social Anxiety (Anx).

Ho 2.4: There will be no significant differences between groups for measures of Depression and Somatization (Hyp, Dep).

Ho 2.5: There will be no significant differences between groups for measures of Psychotic Processes (PId, ThD, Aln, Dev).

Ho 2.6: There will be no significant differences between groups for measures of Depressed Withdrawal (SoI, SDp, Dep, Aln).

Ho 3.1: There will be no differences between aetiological groups on measures of happiness or well-being.

Ho 4.1: There will be no change between pre-operative and post-operative mean scores on any of the BPI scales for the craniofacial patients.

Ho 4.2: Post-operative means on the BPI scales will not show any significant decreases from pre-operative means for the Congenital group.

Ho 4.3: The post-operative means on the BPI scales will not show any significant decreases from the pre-operative means for the Neoplastic group.

Ho 4.4: The post-operative means on the BPI scale will not show any significant decreases from the pre-operative means for the Trauma group.

Ho 4.5: The post-operative means on the BPI scales will not show any significant decreases from the pre-operative means for the BAHA group.

Ho 4.6: The post-operative means on the BPI scales will not show any significant decreases from the pre-operative means for the Other group.

Ho 5.1: There will be no significant increases in post-operative mean scores on the items of the Campbell's Scale of Well-Being when compared to pre-operative means.

Ho 5.2: The Congenital group will not show any significant increases in the mean scores on any of the items of the Campbell's Well-Being Scale between the pre-operative and post-operative assessments.

Ho 5.3: The Neoplastic group will not show any significant increases in the mean scores on any of the items of the Campbell's Well-Being Scale between the pre-operative and post-operative assessments.

Ho 5.4: The Trauma group will not show any significant increases in the mean scores on any of the items of the Campbell's Well-Being Scale between the pre-operative and post-operative assessments.

Ho 5.5: The BAHA group will not show any significant increases in the mean scores on any of the items of the Campbell's Well-Being Scale between the pre-operative and post-operative assessments.

Ho 5.6: The Other group will not show any significant increases in the mean scores on any of the items of the Campbell's Well-Being Scale between the pre-operative and post-operative assessments.

Ho 6.1: The mean scores of the scales on the BPI will not change significantly between the pre-operative assessment, the first post-operative assessment, and the second post-operative assessment.

Ho 6.2: The mean scores on the items of the Campbell's Scale of Well-Being will not change significantly between the pre-operative assessment, the first post-operative assessment, and the second post-operative assessment.

Chapter 4 Results

The results of the data analyses are presented in this chapter. The analyses are subdivided into three major sections: 1) The description of the pre-operative sample in terms of clinical variables (overall and aetiological groups), 2) The changes in clinical variables after treatment, and 3) The changes in clinical variables over time (second post-operative assessment).

Pre-Treatment Sample Characteristics

Screening for Invalid BPI Profiles

After conversion to standard T scores, psychological profiles of the individuals that participated in this part of the study were analysed for characteristic distortions. Jackson (1989) noted that while developing the scale, a particular profile indicated by a high Denial score and low scores on all other scales is indicative of an individual "faking good adjustment." Jackson's research found that the individuals that produce these profiles are "fairly defensive, may deny normal affective responses, and tend to repress unpleasant or emotionally charged cognitions" (p.21). In our sample, eight individuals obtained this characteristic profile, whereby their Denial scores were at least one standard deviation above the mean (or higher), while scores on all other scales were low to average. These profiles are considered invalid and are thus excluded from further data analysis. Figure 1 illustrates these eight profiles.

Jackson (1989) also cautioned researchers about BPI profiles that are characteristic of individuals that are "faking maladjustment." Research in the development of the BPI indicates that distortions in profiles characterized by a low

Denial score and above average scores on all other scales. This profile was found in one

patient in this sample (as illustrated in Figure 2), and was omitted from further analysis.

Each part of the study required that we check for these invalid profiles and omit them

from analysis as they bias the results.

Figure 1. "Faking Good" Profiles
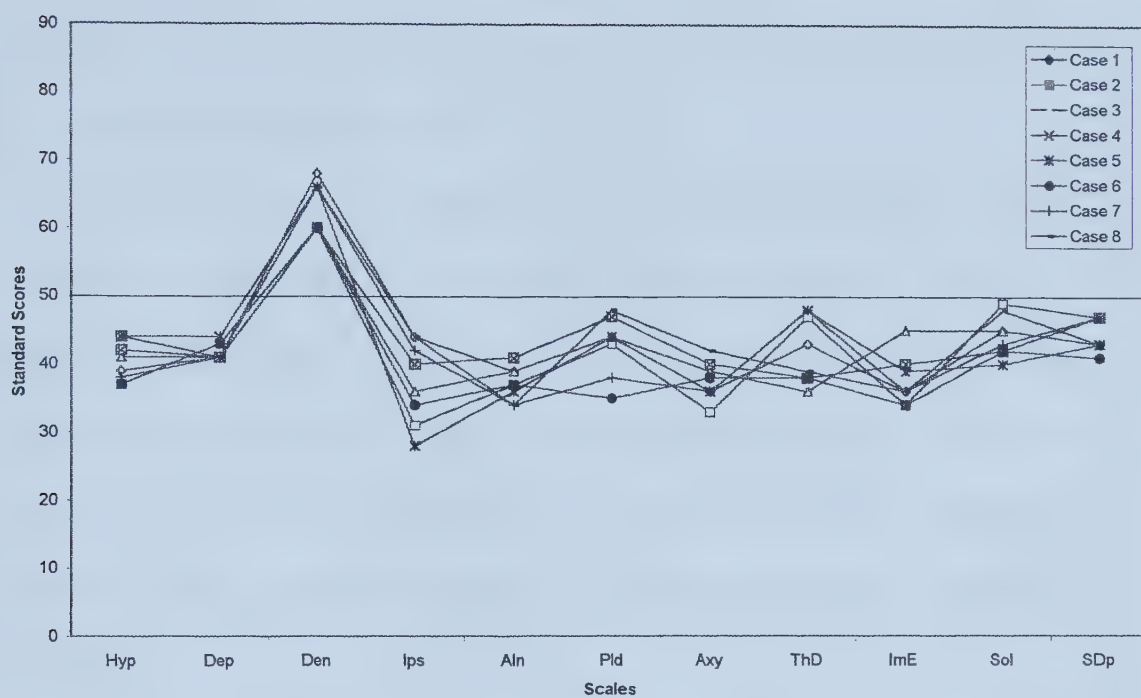
Figure 2. "Faking Maladjustment" Profile
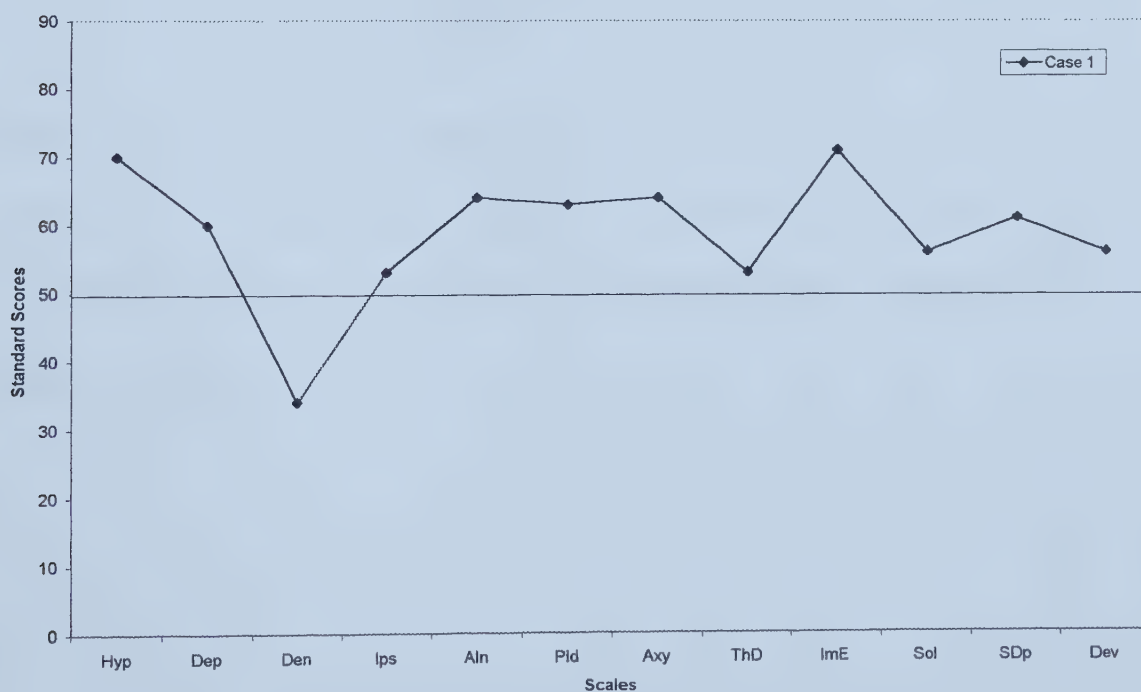
BPI Scale Scores For Pre-Treatment Group (N = 198)

Ho 1.1: In the pre-operative sample, scores on the BPI scales will reflect measures in the normal range of scores.

Table 4.1 illustrates BPI mean scores on the psychological variables for the remaining 198 patients. These results indicate mean scores within the average range for the majority of BPI scales. However, on seven of the twelve scales, scores are slightly higher when compared to the normative mean scores and measures of variability ($M = 50$, $SD = 10$). Those scales with slightly higher mean scores include: Hypochondriasis, Depression, Denial, Persecutory Ideation, Social Introversion, Self-Depreciation, and Deviation.

Also included in Table 4.1 are the number of people that scored significantly above or significantly below the average range of scores in each scale. The differences are immediately visible for the Hypochondriasis, Depression, Denial, Persecutory Ideation, Social Introversion, and Self-Depreciation Scales. These scales show an elevated number of people who are at least one standard deviation above the normative values (pathological range), versus those that are one standard deviation below (non-pathological).

Table 4.1

BPI Standard Scores for Pre-Operative Sample: Means, Standard Deviations, Ranges

Scale	M	SD	Range	Above 1 SD	Below 1 SD
Hypochondriasis	51.7	8.7	37-76	38	14
Depression	52.0	11.6	40-94	45	2
Denial	52.5	9.0	32-84	42	15
Interpersonal Problems	48.2	9.0	28-76	22	41
Alienation	48.5	9.4	31-94	28	32
Persecutory Ideation	52.1	11.5	35-85	46	22
Anxiety	48.2	9.5	32-77	25	50
Thinking Disorder	49.4	10.5	33-92	36	36
Impulse Expression	48.4	9.6	33-84	28	37
Social Introversion	52.9	11.8	34-92	40	19
Self-Depreciation	51.7	10.6	41-103	32	0
Deviation	51.3	11.0	39-103	27	20

Note. N = 198

Characteristics of Pre-Operative Aetiological Groups

After screening for invalid profiles, the remaining sample is categorized based on aetiological divisions (Congenital, Neoplastic, Traumatic,BAHA, and Other). The scores on the BPI are reported for each group in Table 4.2

Hypothesis 2.1

Ho 2.1: There will be no significant between group differences for any of the

psychometric scales of the BPI.

The results of the one-way ANOVAs (Table 3) indicated significant differences

($p < .05$) for the following BPI scales: Depression, Denial, and Thinking Disorder,

Persecutory Ideas, and Impulse Expression

Table 4.2

Between Aetiological Group Differences on BPI Scaled Scores (N = 198)

Scale	Congenital (n = 20) M (SD)	Neoplastic (n = 47) M (SD)	Trauma (n = 26) M (SD)	BAHA (n = 99) M (SD)	p
Hyp	50.2 (7.8)	53.6 (7.2)	53.5 (11.2)	50.7 (8.7)	0.152
Dep	55.6 (13.8)	53.3 (13.7)	56.5 (11.3)	49.5 (9.7)	0.012
Den	48.8 (7.4)	52.6 (9.3)	47.8 (5.5)	54.2 (9.1)	0.002
IPs	49.3 (6.9)	47.3 (8.3)	51.9 (7.3)	47.7 (10.0)	0.156
Aln	50.9 (7.0)	47.1 (8.4)	51.3 (13.1)	47.8 (9.0)	0.165
PId	59.1 (11.4)	50.6 (9.9)	51.2 (11.4)	51.4 (11.7)	0.029
Anx	51.8 (7.6)	48.1 (9.6)	49.5 (10.1)	48.4 (8.6)	0.300
ThD	48.7 (11.1)	50.1 (9.0)	48.4 (8.6)	49.6 (11.7)	0.907
ImE	54.4 (9.3)	46.6 (8.0)	55.7 (12.1)	46.3 (8.3)	0.000
SoI	52.5 (11.5)	55.2 (13.7)	51.4 (9.8)	52.1 (11.1)	0.443
SDp	55.5 (13.4)	52.8 (11.7)	51.2 (9.3)	50.8 (9.8)	0.292
Dev	53.6 (10.2)	50.7 (11.4)	53.2 (11.9)	50.6 (11.0)	0.554

Note. The aetiological group classified as Other has an insufficient n value (6) thus can not be statistically compared to the other groups. The standard scores obtained and the standard deviations are as follows: Hyp 52.5 (8.4); Dep 50.0 (10.2); Den 57.0 (13.6); IPs 42.8 (9.0); Aln 51.7 (11.5); PId 55.3 (16.3); Anx 55.7 (12.1); ThD 48.0 (4.6); ImE 46.3 (7.3); SoI 55.0 (15.7); SDp 48.7 (8.4); Dev 52.2 (8.6)

The Congenital group had the highest average scores for the following scales: PId, Anx, SDp, and Dev. The Neoplastic group had the highest scores for the scales of Hyp, ThD, and SoI. The Trauma group had the highest scores on the scales of Dep, Ips, Aln, and ImE. The BAHA group had the highest mean scores for the Den and PId scales. The lowest average score for Hyp was obtained by the Congenital group. The Neoplastic group had the lowest average scores on the Ips, ImE, Aln, PId, and Anx scales. Trauma patients received the lowest scores on the Den, ThD, and SoI scales, while the BAHA patients had the lowest scores in terms of Dep, Sdp, and Dev.

Hypothesis 2.2 - 2.6

Ho 2.2: There will be no significant between group differences for measures of

Inadequate Impulse Control (ImE, Ips, Anx, Aln, Den).

Ho 2.3: There will be no significant between group differences for measures of

General Social Anxiety (Anx).

Ho 2.4: There will be no significant between group differences for measures of

Depression and Somatization (Hyp, Dep).

Ho 2.5: There will be no significant between group differences for measures of

Psychotic Processes (PId, ThD, Aln, Dev).

Ho 2.6: There will be no significant between group differences for measures of

Depressed Withdrawal (SoI, Sdp, Dep, Aln).

As indicated in Table 4.2, the between group differences varied between scales with five of the twelve scales showing significant results. By strict standards (need a p value of less than .05) we fail to reject the null hypotheses 2.2, 2.3, 2.4. 2.5, and 2.6 since

no single group consistently scored highest on all scales making up these factors. The factor general Social Anxiety is based on the measurement of one scale, Anxiety. Our study results do not indicate significant between group differences.

Hypothesis 3.1

Ho: There will be no significant differences between aetiological groups on measures of happiness or well-being.

Results of the one-way ANOVAs for individual items on the Campbell's Scale of Well-being indicate significant differences between groups in three cases. Table 4 illustrates these findings.

Table 4.3

Between Aetiological Group Differences In the Campbell's Sense of Well-Being Item

Scores (N = 198)

Item	Congenital M (SD)	Neoplastic M (SD)	Trauma M (SD)	BAHA M (SD)	Other M (SD	p
Boring-Interesting	4.8 (1.6)	5.3 (1.7)	4.9 (1.4)	5.5 (1.4)	5.3 (1.9)	0.176
Miserable-Enjoyable	5.1 (1.30	5.3 (1.4)	5.4 (1.4)	5.7 (1.3)	5.8 (1.2)	0.281
Useless-Worthwhile	5.5 (1.2)	5.9 (1.4)	5.6 (1.5)	6.0 (1.2)	5.8 (1.5)	0.192
Lonely-Friendly	5.2 (1.7)	5.7 (1.7)	5.7 (1.5)	5.7 (1.7)	5.7 (1.9)	0.597
Empty-Full	5.2 (1.3)	5.4 (1.4)	5.3 (1.3)	5.8 (1.3)	6.0 (1.3)	0.058
Discouraging-Hopeful	5.0 (1.7)	5.9 (1.4)	5.8 (1.3)	6.5 (4.0)	5.8 (1.5)	0.211
Disappointing-Rewarding	5.0 (1.4)	5.4 (1.5)	5.3 (1.4)	5.9 (1.2)	5.8 (1.2)	0.011
No Chance-Brings Out Best	4.9 (1.3)	5.5 (1.3)	4.8 (1.6)	5.8 (1.3)	6.2 (0.8)	0.003
Dissatisfied-Satisfied	4.7 (1.5)	5.3 (1.2)	4.9 (0.9)	5.5 (1.2)	5.3 (1.3)	0.011

Note. The Other group is of insufficient size (n = 6) to compare statistically with the other groups, thus was omitted from analysis of significance. The number of subjects in each remaining group is as follows: Congenital (n = 20), Neoplastic (n = 47), Trauma (n =26), and BAHA (n = 99).

On the item in which subjects were asked to rate aspects of their present life on a seven-point scale between two extremes: "my present life is disappointing" and "my present life is rewarding," significant differences (p = .011) were found between groups with the BAHA rating the highest and the Trauma group rating the lowest. Results on the item in which subjects were asked to rate aspects of their present life with the extremes "life doesn't give me a chance - brings out the best in me" also showed significant differences (p = .003) between groups. The highest overall score was

obtained by the BAHA group, while the trauma group had the lowest score. The item

which is intended to measure overall satisfaction with life as a whole with the two

extremes being " dissatisfied with life - satisfied with life," also showed significant ($\underline{p}$ =

.011) between group differences. A fourth item, "life is empty - life is full" approaches

significant   ($\underline{p}$ = .058) between group differences. The BAHA group received the

highest average score, while the Congenital group received the lowest average score on

this item. Given the results, we may accept hypothesis 3.1.

<p align="center">Pre-Post treatment Study</p>

<u>BPI Scale Scores For Post-Treatment Group</u>

Hypothesis 4.1

Ho 4.1: There will be no change between pre-operative and post-operative mean

scores on any of the BPI scales for the craniofacial patients.

Paired t-test analysis was performed on the Pre-Test/ Post-Test measures of the

BPI scales. Using a .05 level of significance (one-tailed), null hypothesis 4.1 was

rejected. The scales that display significant differences between the pre-test and post-test

are: Alienation ($\underline{p}$=.042), Persecutory Ideas ($\underline{p}$=.052), and Thinking Disorder ($\underline{p}$=.037).

Two of these scales (PId, ThD) show enough significance to justify a change in

Cognitive Functioning, as described by Jackson (1989). The results are illustrated in

Table 4.4.

Table 4.4

Pre-Test/ Post-Test Means, Standard Deviations, and Significance of Differences

	Pre-Test		Post-Test		p
Scale	M	(SD)	M	(SD)	
Hyp	53.5	(9.1)	53.2	(10.4)	0.711
Dep	51.6	(10.8)	51.2	(11.3)	0.694
Den	52.3	(9.4)	52.5	(9.6)	0.763
IPs	48.5	(9.1)	47.9	(8.9)	0.549
Aln	50.4	(9.9)	48.1	(8.8)	0.042
PId	53.3	(12.1)	51.2	(11.9)	0.052
Anx	49.1	(10.1)	48.0	(10.7)	0.251
ThD	51.0	(11.8)	48.5	(9.7)	0.037
ImE	48.4	(8.6)	47.4	(8.9)	0.231
SoI	53.0	(11.8)	53.4	(12.6)	0.733
SDp	50.6	(11.2)	51.8	(11.5)	0.414
Dev	52.6	(11.8)	51.5	(10.8)	0.289

Note. N = 77

Hypothesis 4.2 - 4.6

Ho 4.2: The post-operative means on the BPI scales will not show any significant

decrease from pre-operative means for the Congenital group.

Ho 4.3: The post-operative means on the BPI scales will not show any significant

decrease from the pre-operative means for the Neoplastic group.

Ho 4.4: The post-operative means on the BPI scales will not show any significant

decrease from the pre-operative means for the Trauma group.

Ho 4.5: *The post-operative means on the BPI scales will not show any significant*

decreases from the pre-operative means for the BAHA group.

Ho 4.6: *The post-operative means on the BPI scale will not show any significant*

decreases from the pre-operative means for the Other group.

The results ($\underline{M}$ and $\underline{p}$ values) of the post-operative data for each aetiological

group are illustrated in Table 4.5 The null hypothesis 4.2 is rejected because there was a

significant difference (p=0.037) found between the pre-operative and post-operative

means (mean decreased) for the scale on the BPI that evaluates Anxiety for the

Congenital group. Null hypothesis 4.3 was also rejected because of the significant

difference (p= 0.001) found between the pre- and post-operative measure of Alienation

for the Neoplastic group. The Trauma group mean average decreased, between the pre-

and post-operative assessment, significantly (p =0.051) for the scale of Persecutory Ideas,

thus allowing us to reject null hypothesis 4.4. The BAHA group also showed a

significant difference between pre- and post-operative measures for one of the scales,

Thinking Disorder, with a p value of .029, therefore null hypothesis 4.5 was rejected.

For the Other group there was insufficient evidence at the p<.05 level in terms of a

decrease in mean scores for any of the scales of the BPI, thus we fail to reject the null

hypothesis 4.6.

Table 4.5

Pre-Test/Post-Test Means and Significant Differences For Each Aetiological Group (N =77)

Scale	Congenital (n = 5)			Neoplastic (n = 17)			Trauma (n =12)			BAHA (n = 39)		
	Pre-Test	Post-Test		Pre-Test	Post-Test		Pre-Test	Post-Test		Pre-Test	Post-Test	
	M	M	p	M	M	p	M	M	p	M	M	p
Hyp	47.8	51.1	0.216	56.7	56.3	0.807	52.8	50.4	0.343	52.7	52.6	0.921
Dep	49.6	44.2	0.164	55.1	51.2	0.226	52.3	51.1	0.449	49.9	51.9	0.157
Den	48.2	50.4	0.582	52.1	50.1	0.343	47.2	49.8	0.051	54.5	55.4	0.478
IPs	51.4	49.2	0.432	48.1	46.8	0.557	52.4	55.1	0.361	47.5	45.9	0.301
Aln	52.4	52.6	0.911	51.6	45.9	0.001	47.8	49.9	0.559	49.8	47.5	0.157
PId	52.6	58.1	0.091	53.9	51.8	0.309	49.1	45.3	0.051	53.3	52.7	0.69
Anx	52.1	44.4	0.037	50.1	47.6	0.227	49.6	47.4	0.398	48.6	49.2	0.666
ThD	47.2	52.1	0.485	51.9	49.5	0.341	47.2	44.8	0.201	52.5	48.6	0.029
ImE	54.6	51.4	0.484	46.4	46.4	1.000	53.1	51.2	0.365	46.9	46.2	0.543
SoI	52.2	50.8	0.374	53.8	54.8	0.544	47.1	46.1	0.639	53.9	55.2	0.497
SDp	47.6	46.8	0.801	52.1	51.9	0.969	47.5	48.2	0.711	51.2	53.8	0.301
Dev	55.6	54.4	0.672	51.4	50.8	0.827	51.1	51.1	1.000	52.9	51.5	0.321

Table 4.5 Continued

Scale	Pre-Test $\underline{M}$	Post-Test $\underline{M}$	$\underline{p}$
Hyp	57.1	57.1	1.000
Dep	54.1	52.8	0.831
Den	51.5	46.3	0.235
IPs	44.3	48.1	0.08
Aln	55.8	54.1	0.518
PId	57.8	53.3	0.684
Anx	45.5	44.5	0.671
ThD	48.5	50.7	0.513
ImE	49.5	46.3	0.521
SoI	59.8	55.5	0.579
SDp	51.5	48.8	0.551
Dev	56.1	52.8	0.435

Other ($\underline{n}$=4)

Hypothesis 5.1

Ho 5.1: *There will be no significant increase in post-operative mean scores on the items*

of the Campbell's Scale of Well Being, when compared to the pre-operative

means.

The data that evaluates this hypothesis revealed no significant differences

between the pre-operative and post-operative scores on the items of the Campbell's Scale

of Well-Being at the 0.05 level of significance, thus we fail to reject the null hypothesis

5.1. The significance values for each item are as follows: Boring-Interesting (p=0.652),

Miserable-Enjoyable (p=0.520), Useless-Worthwhile (p= 0.310), Lonely-Friendly

(p=0.889), Empty-Full (p=0.933), Discouraging-Hopeful (p=0.486),

Disappointing-Rewarding (p=0.326), No Chance-Brings Out the Best (p=0.808), and

Dissatisfied-Satisfied (p=1.00).

Hypothesis 5.2 - 5.6

Ho 5.2: *The Congenital group will not show any significant increases in the mean*

scores on any of the items of the Campbell's Well-Being Scale between the

pre-operative and post-operative assessments.

Ho 5.3: *The Neoplastic group will not show any significant increases in the mean*

scores on any of the items of the Campbell's Well-Being Scale between the

pre-operative and post-operative assessments.

Ho 5.4: *The Trauma group will not show any significant increases in the mean*

scores on any of the items of the Campbell's Well-Being Scale between the

pre-operative and post-operative assessments.

Ho 5.5: The BAHA group will not show any significant increases in the mean

scores on any of the items of the Campbell's Well-Being Scale between the

pre-operative and post-operative assessments.

Ho 5.6: The Other group will not show any significant increases in the mean

scores on any of the items of the Campbell's Well-Being Scale between the

pre-operative and post-operative assessments.

Changes in the mean scores on particular items of the Campbell's Well-Being Scale were found for some of the aetiological groups. The pre-test (pre-operative) and post-test (post-operative) mean scores as well as their significance values at the $p<0.05$ level are presented in Table 4.6. There are an inadequate number of people in some of the groups (Other and Congenital), thus between group differences are not statistically explored.

Table 4.6

Campbell's Scale of Well-Being: Pre-Test and Post-Test Item Means and Significant Differences For Aetiological Groups (N= 77)

	Congenital (n=5)			Neoplastic (n=17)			Trauma (n = 12)		
	Pre-Test	Post-Test		Pre-Test	Post-Test		Pre-Test	Post-Test	
Item	M	M	p	M	M	p	M	M	p
Boring-Interesting	5.6	5.8	0.749	5.3	5.6	0.236	5.3	5.5	0.275
Miserable-Enjoyable	5.2	5.9	0.242	5.4	5.6	0.332	5.7	5.3	0.175
Useless-Worthwhile	5.6	6.6	0.189	5.9	6.1	0.835	5.9	5.9	1.000
Lonely-Friendly	5.2	6.2	0.231	5.9	5.8	0.864	6.4	5.8	0.171
Empty-Full	5.6	6.6	0.231	5.3	5.6	0.231	5.8	5.8	1.000
Discouraging-Hopeful	5.2	6.6	0.206	5.7	6.4	0.041	5.8	5.7	0.777
Disappointing-Rewarding	5.4	6.2	0.338	5.4	6.1	0.018	5.5	5.5	1.000
No Chance-Brings out Best	4.6	5.8	0.208	5.3	5.9	0.037	5.4	5.3	0.723
Dissatisfied-Satisfied	4.6	5.8	0.208	5.4	5.5	0.814	5.1	5.3	0.638

Table 4.6 Continued

Item	BAHA (n=39)			Other (n=4)		
	Pre-Test M	Post-Test M	p	Pre-Test M	Post-Test M	p
Boring-Interesting	5.4	5.0	0.088	4.5	5.1	0.182
Miserable-Enjoyable	5.7	5.4	0.302	5.3	5.3	1.000
Useless-Worthwhile	5.9	5.9	0.697	5.3	5.8	0.182
Lonely-Friendly	5.5	5.5	1.000	5.1	5.3	0.718
Empty-Full	5.6	6.1	0.243	5.5	5.3	0.391
Discouraging-Hopeful	6.2	5.8	0.046	5.3	6.3	0.092
Disappointing-Rewarding	5.8	5.3	0.053	5.3	6.1	0.215
No Chance-Brings out Best	5.8	5.5	0.292	5.8	5.1	0.215
Dissatisfied-Satisfied	5.4	5.3	0.455	5.1	4.3	0.547

Paired t-test analysis was performed on Pre-test/ Post-test measures of the items within the Campbell's Sense of Well-Being scale. Using a 0.05 level of significance (one-tail test) null hypotheses 5.2, 5.3, 5.4, 5.5, and 5.6 can not be rejected. The stipulation for rejecting these hypotheses is that there must be a significant increase in the mean scores on the items of the scale. While the BAHA group (hypothesis 5.5) did show significant differences between pre- and post-operative scores for the following two items: "life is discouraging-hopeful" with $p = 0.046$, and "life is disappointing-rewarding" with a $p = 0.053$, these were due to decreases in the post-operative item means relative to the pre-operative mean scores. Taken together, the overall results of hypotheses 5.1 to 5.6 suggest that at the time of the first post-operative assessment, craniofacial patients in general, and aetiological groups specifically, show no improvement in their sense of well-being and happiness after surgical intervention.

Results of the Second Post-Operative Assessment: Pre-Post-Post

Repeated measures ANOVAs were performed on the last set of data in order to assess if they were changes over time in mean scores on the BPI scales or the items of the Campbell's Scale of Well-Being. Analysis was performed only on the craniofacial group as a whole (using a 0.05 level of significance) as there were an insufficient number of patients in each aetiological group to measure between group differences.

Hypothesis 6.1

Ho 6.1: The mean scores of the scales on the BPI will not change significantly between

the pre-operative assessment, the first post-operative assessment, and the second

post-operative assessment.

The results of the pre-post-post repeated measures ANOVAs for the BPI scales

are presented in Tables 4.7 (means, standard deviations, F values, significance $p<0.05$)

Sphericity is assumed and Huynh-feldt is greater than 0.75 for all scales.

Table 4.7

Pre-Post-Post BPI Within Subject Effects: Mean Scale Scores and Standard Deviations, F

Values and Significance (N = 39)

Scale	Pre-Test		First Post-Test		Second Post-Test			
	M	(SD)	M	(SD)	M	(SD)	F	p
Hyp	52.8	(8.1)	53.2	(9.3)	52.4	(10.6)	0.187	0.831
Dep	49.4	(9.8)	49.5	(9.3)	50.1	(12.9)	0.101	0.905
Den	51.1	(9.9)	49.6	(8.4)	51.9	(8.7)	1.816	0.171
IPs	47.8	(8.4)	48.4	(8.9)	49.2	(9.5)	0.491	0.614
Aln	49.1	(8.7)	47.9	(8.3)	47.1	(5.5)	1.257	0.291
PId	51.7	(10.9)	50.1	(10.6)	49.3	(10.7)	1.605	0.208
Anx	50.1	(9.8)	48.1	(9.4)	49.5	(9.9)	1.205	0.305
ThD	50.7	(11.1)	49.1	(9.80	49.2	(11.2)	0.628	0.536
ImE	48.5	(8.8)	48.4	(9.4)	48.4	(10.2)	0.005	0.995
SoI	51.5	(11.2)	52.8	(13.9)	53.5	(13.6)	1.281	0.284
SDp	49.5	(11.2)	50.8	(10.2)	49.4	(11.9)	0.437	0.647
Dev	53.1	(10.4)	51.2	(8.8)	51.6	(10.7)	0.609	0.551

Note. Degrees of Freedom (df) = 2; $p<0.05$

The data presented in Table 4.7 (above) supports the null hypothesis 6.1, thus we fail to reject it according to the criteria stipulated. For this sample ($\underline{N}$= 39) the repeated measures ANOVAs for the three assessment periods yielded no significant p values. When examining the mean averages of each test period for each scale, mean scores showed no particular pattern throughout all the scales. The scales that did show slight decreases between the pre-operative assessment and the first post-operative assessment, with the scores remaining relatively stable through the second post-operative assessment are Alienation, Thinking Disorder, and Deviation. Persecutory Ideas mean scores decreased slightly over the course of each assessment. Social Introversion and Interpersonal Problems increased over each consecutive assessment. Denial and Anxiety displayed decreases in mean scores by the first post-operative assessment but returned near to the pre-operative levels by the second post-operative assessment. Hypochondriasis and Self-Depreciation showed an increase in mean scores at the first post-operative assessment, but returned to near pre-operative levels by the second post-operative testing period. Depression was stable for the first two assessments but showed an overall increase by the time of the third assessment. Impulse Expression was relatively stable over the three testing periods. Again, none of the changes were sufficient to justify rejecting hypothesis 6.1.

Hypothesis 6.2

Ho 6.2: The mean scores on the items of the Campbell's Scale of Well-Being will not change significantly over time between the pre-operative assessment, the first post-operative assessment, and the second post-operative assessment.

The results of this set of repeated measures ANOVAs are presented in Table 4.8. The data includes the mean scores and standard deviations for each assessment, F values, and significance at p<0.05. Sphericity is assumed and the Huynh-Feldt values are all greater than 0.75.

Table 4.8

Pre-Post-Post Campbell's Sense of Well-Being Scale Within Subject Effects: Item Means, Standard Deviations, F Values, and Significance (N= 39)

Item	Pre-Test		First Post-Test		Second Post-Test			
	M	(SD)	M	(SD)	M	(SD)	F	p
Boring-Interesting	5.6	(1.3)	5.6	(1.2)	5.4	(1.2)	0.685	0.507
Miserable-Enjoyable	5.7	(1.1)	5.6	(1.1)	5.4	(1.3)	1.609	0.207
Useless-Worthwhile	6.1	(1.1)	6.2	(1.1)	5.9	(1.4)	0.698	0.501
Lonely-Friendly	5.7	(1.7)	5.9	(1.4)	5.6	(1.5)	0.803	0.452
Empty-Full	5.9	(1.2)	5.8	(1.2)	5.6	(1.3)	1.737	0.183
Discouraging-Hopeful	6.0	(1.4)	6.2	(1.0)	5.9	(1.2)	0.535	0.588
Disappointed-Reward	5.8	(1.2)	5.7	(1.3)	5.7	(1.40	0.104	0.893
No Chance-Brings Out Best	5.7	(1.3)	5.7	(1.2)	5.6	(1.1)	0.041	0.96
Dissatisfied-Satisfied	5.2	(1.2)	5.4	(1.2)	5.4	(1.1)	0.392	0.677

Note. Degrees of Freedom (df) = 2; p <0.05

The values presented above lack significance at the p<0.05 level thus we fail to reject null hypothesis 6.2.

Chapter 5 Summary and Discussion

The focus of this study was the exploration of the psychological and psychosocial dimensions of a sample of craniofacially disfigured individuals using the basic Personality Inventory and the Campbell's Sense of Well-Being scale. The assessments occurred both before and after surgical intervention provided by the COMPRU facility at the Misericordia Hospital. Surgical intervention is intended to restore both form and function with the hope that well-being and psychological problems will be improved. This chapter includes a discussion of the study's findings in relation to the literature reviewed in Chapter 2 as well as a discussion of the implications of these findings. The organization of this chapter is as follows: 1) summary of results and relationship to prior research; 2) conclusions; and 3) implications for further research.

Summary

This study attempted to build on past research, in the area of facial disfigurement, and sought to address some of the problems cited in terms of methodologies of prior studies. Use of a standardized psychometric tool, the Basic Personality Inventory (BPI) and the longitudinal aspects of this study attempted to ameliorate the problems cited by prior studies such as List and Stacks (2000) Unfortunately, there are several aspects of this study that suffer the same methodological weaknesses cited by other authors such as lack of a control group and poor control over the time intervals between assessments and surgical intervention. Despite these limitations, the findings of this study support several theoretical notions and extant research findings.

Our initial profile analysis of the pre-operative sample (N=207) yielded nine patient profiles consistent with motivated distortion of the results. Eight of these profiles were consistent with Jackson's (1989) description of "faking good" and one profile was consistent with "faking maladjustment." For those "faking good" three of the individuals were female and five were male. The ages varied and there were no consistent demographic variables that would predict the likelihood of "faking good." Jackson (1989) suggested that individuals that gave this type of score pattern cope with stress through active flight and avoidance. It is also possible that, despite assurance that profile scores would not necessarily impact patient involvement with COMPRU, some individuals still attempted, consciously or unconsciously, to alter their profiles so that they would look like they had less psychological problems than there really were. One person had a profile indicative of "faking maladjustment." This type of response pattern could be motivated by the desire to present problems as worse than they really are in order to increase the chance of receiving surgery. Whatever the motivation both profile types had to be removed from further analysis as they are biases and not true measures of the psychological and psychosocial variables of interest.

Our pre-treatment sample as a whole (all the craniofacial patients assessed, excluding distorted profiles) had scores that averaged within the normal range on the Basic Personality Inventory. That is, they fell within the 50 ± 10 range deemed acceptable for normal psychological functioning as defined by the norm value T scores. Although some of the averages for scale scores were slightly higher than 50, such as Hypochondriasis, Depression, Denial, Persecutory Ideas, Social Introversion,

Self-Depreciation, and Deviation, they are still considered to represent normal psychological functioning. Overall, these results indicate that the COMPRU patient sample, as a whole, does not differ significantly from the normative population on any of the psychological dimensions measured by the BPI.

Despite these general findings, there is another way to look at the results. The BPI is a clinical instrument and each case is usually analysed as a profile of scaled scores. Concerns regarding specific psychological characteristics are then derived from the deviations from the normative sample on individual scales. Average scale scores that are greater than one standard deviation above the norm, that is 60 or greater, represent areas of psychological risk for the particular individual being assessed. Similar to Pertschuk and Whitaker (1987) we found considerable variation within the population on the different psychological dimensions assessed pre-operatively. Overall, up to 23% of the sample scored over one standard deviation above the norm on one or more scales (Depression, Social Introversion etc.). On some of the scales up to 12.6% of the sample scored two standard deviations above the norm on one or more scales (Persecutory Ideation). Our results indicated that Depression, Denial, Persecutory Ideation, Social Introversion, and Self-Depreciation were the scales with the subjects with the most abnormally high scores. These results were similar to Stephanson's (1994) except that that he did not find elevated scores on the Denial scale. While the overall means were in the normal range, psychological distress as indicated by scale scores greater than one standard deviation above the norm is suggested by our results for the previously mentioned scales.

These results support Pertchuk and Whitaker's (1987) assertion that while there are psychological problems among the facially disfigured, deficits are rarely profound and within the realm of severe psychopathology, as indicated by overall mean scores on the scales. Jensen (1978) concluded that his research suggests that craniofacial patients do not suffer more psychological pathologies than other people which is consistent with our sample overall in terms of mean scores but is inconsistent when examining the scores on the basis of scores according to standard deviation values above the norm (by at least one standard deviation). What both authors do state, as does Pruzinsky (1992) is that this population is at more risk, or vulnerable, to having psychological problems than the normal population. The areas of concern that did show higher scores, placing certain patients in the at-risk category are consistent with prior research on craniofacial patients suffering from depression (Deaton & Langman,1986; Ishigooka et al., 1998; Napolean, 1993; Pruzinsky, 1992), and distorted self-perception and social difficulties (Blomberg and Lindquist, 1983; Endriga and Kapp-Simon, 1999; Macgregor, 1990; Pertschuk and Whitaker 1987; 1988, Richman, 1998; Sarwer et al., 1999;).

One result that was surprising was that the scale measuring Anxiety was not above average overall for the craniofacial patients examined for this study. This result differs from Macgregor's (1990) and McGrouther's comments that craniofacial patients live with unremitting stress and anxiety. It is possible that our results differed because our measure was for general anxiety in a variety of contexts while Macgregor, McGrouther, and other authors specifically discussed social anxiety. If we were to use

our Social Introversion scale as a more appropriate scale for comparison, then the results we found support those conclusions of prior research.

When divided on the basis of aetiological origins of injury (Congenital, Neoplastic, Trauma, BAHA, and Other) significant between group differences were found. Depression and Impulse Expression scores were significantly higher for those with Traumatic injuries and lowest for those receiving the Bone-Anchored Hearing Aids (BAHA). BAHA patients has the highest Denial scores while Trauma patients had the lowest. Persecutory Ideation was highest among those with Congenital deformities and lowest among those with Neoplasias. When compared to the overall patient sample, higher average scores were found when analysing scale scores by groups. Social Introversion and Self-Depreciation scores while not significantly different among groups did have higher mean averages than the craniofacial group as a whole. Social Introversion scores were highest for those with Neoplasias and Self-Depreciation was highest for those with Congenital deformities.

There were no significant between group differences when individual scales were factored together in the following categories: Inadequate Impulse Control, General Social Anxiety, Depression and Somatization, Psychotic Processes, or Depressed Withdrawal.

As might be expected from the trends on the BPI scale scores, measurements of life satisfaction, finding life rewarding, and life bringing out the best in them was highest among BAHA patients. Scores on the items that assessed how rewarding life is as well as how satisfied with life they are were lowest among the Congenital patients. Trauma

patients had the lowest group average score on the item testing whether they felt life gives them a chance or is against them.

Caution in the interpretation and generalization of these results is necessary. The significant differences reported for the between group analysis is not between group scores and the normative averages (i.e. no control group). Also, our group may differ from craniofacial patients in other studies because the COMPRU patients are in the active process of receiving help for repairing their disfigured faces.

Our first post-operative assessment consisted of patients from each of the aetiological groups discussed. Most of the patients were treated with osseointegrated implants (except one person who received autogenous reconstruction), both extraorally and intraorally. The age range of these patients varied. The pre-test/post-test results for the craniofacial group, as a whole, suggested significant decreases in mean scores for three scales: Alienation, Persecutory Ideas, and Thinking Disorder. These could be interpreted as a positive change in these psychological dimensions post-operatively with a trend towards stability. The other variables of concern such as Depression, Interpersonal Problems, Social Introversion, and Self-Depreciation did not display the changes expected. This conflicts with the results found in much of the literature that states that there are significant improvements in these particular psychological areas after facial reconstruction of craniofacial patients (Blomberg, 1985; Deaton and Langman, 1986; Kent, 1992; Napolean, 1993; Sela and Lowenthal, 1980).

Significant decreases were found on certain variables when the groups were analysed individually. The Congenital group results suggest a significant a significant

decrease in Anxiety. The Neoplastic group had significantly less problems in terms of feelings of Alienation. The Trauma groups problems with Persecutory ideas decreased post-operatively, as did the BAHAs higher mean scores on the Thinking Disorder scale. When the craniofacial group is subdivided according to aetiology, some of the expected changes, given the literature results, are observed. These results appear to confirm some of our suspicions that grouping all craniofacial patients together when analysing responses to corrective surgery is illogical, as they are not uniform in their psychological dimensions.

The limitations of our study must be acknowledged when interpreting this part of the study. Our poor control over when patients were assessed could have affected our results. The patients were assessed anywhere from 0 to 3432 (average 193 days) days prior to surgery and from 11 to 2232 days (average 655) post-operatively. Clearly, these time ranges may have a significant impact on the results. It is possible that the closer to surgery the patients are, the more positively they are feeling about themselves and the potential for change which may make their pre-operative scores better than they are when surgery is not expected. In addition, the role of expectations and hope may have affected our results, as suggested by Borah and his colleagues (2000) and Grossbart and Sarwer (1999) in their elective cosmetic surgery studies. Much of the research on psychological reactions to elective cosmetic surgery is neglected in craniofacial surgery studies. Our results would seem to suggest that this dismissal is significant, as the results of these types of studies has value for craniofacial research.

Another potentially confounding variable that may have affected these results, either in conjunction with the time issue or separately from it, is the potential for patients to slightly distort their scores in a positive direction, though with more subtlety than would be indicated by "faking good" profiles described by Jackson. This slight distortion causing the patients to look like they are doing better than they really are could have occurred either pre- or post-operatively. Pre-operatively the patients may have feared exclusion from treatment at COMPRU and post-operatively they may have been concerned about disappointing the staff at COMPRU who extended substantial effort on their behalf.

Previous literature commenting on the psychological benefits of osseointegrated implants in prosthetic surgery in terms of well-being (Blomberg, 1985; 1991; Kent and Johns, 1994) is not well supported by our study. Overall satisfaction of life (well-being) did increase for the Congenital, Neoplastic, and Trauma groups but none of the results were statistically significant. The Neoplastic group did show significant improvement on three items of the Campbell's Scale of Well-Being (increased feelings of hope, feeling life is rewarding, and life affording the person opportunities). The BAHA group had a significant decrease that suggests that they found life more disappointing after surgery. These results would suggest that patients that receive osseointegrated implants do not necessarily reap the hoped for psychological benefits of surgical intervention. This conclusion is supported by Jensen (1978) and Wilkes and Wolfaardt's (1988) suspicions regarding poor treatment outcomes. Again, our interpretation of the data must take into account the aforementioned limitations.

Our second post-surgical assessment was on a fairly small group of patients (42) and aetiological groups could not be compared. The craniofacial patient group as a whole displayed no significant changes over time on their BPI scores. That is, both post-surgical assessments did not differ significantly from pre-operative values. The Campbell's Well-Being Scale also did not yield any change over time. These results support Epsie's (1989) claim that psychological distress does not decrease significantly after reconstructive surgery. Our results do not support the concept of improved quality of life after osseointegrated implantation and prosthetic attachment (Kent & John, 1994; Kiyak et al., 1990; Rogers et al., 1999), though the primary sources of information regarding this type of reconstruction come from dental implant literature. Albrektsson and his colleagues (1987) claimed that among the 189 patients they surveyed after osseointegrated prosthetic attachment, 80% reported substantial long-term improvements in intrapsychic health, self-esteem, and self-security. Our results do not coincide, though comparison is limited because of the methodological differences of our study. Our interpretations are also limited because the time at which the second post-surgical assessment was administered was not well controlled. The time ranged from 272 to 3772 days after surgery, with an average of 1232 days.

Conclusions

The face plays a pivotal role in human interaction. When an individual must cope with a facial defect, the nature of human interaction may change, potentially towards the detriment of the person with the defect. While the person must cope with loss of both form and function, the reaction of society to that person may have an

enormous impact on their intrapsychic health (Sarwer et al., 1999). These issues have played an important role in the push towards advancements in reconstructive surgery, especially osseointegration. The hope is that with repair to damaged structures or replacement of those structures that are missing, those with craniofacial defects can be permitted to live life with a more "normal" face and thus a more "normal" life.

Many professionals working in the realm of oral and maxillofacial rehabilitation and elective cosmetic surgery have found that failure of treatment to improve the life of patients is due, in part, to insufficient assistance with the psychological problems that may be present in the population being worked with (Borah et al., 2000; Jensen, 1978; Wilkes & Wolfaardt, 1988). Our results would suggest that these assertions hold some element of truth. The pre-operative craniofacial group as a whole seemed to have a higher incidence of psychological problems such as depression, denial, persecutory ideation, hypochondriasis, social introversion, and deviation when compared to the normative population. When the variable of aetiology is factored in, there are definite between group differences for certain variables. The trauma patients had the most problems with depression and impulse expression, the BAHA group had the most problems with denial, and the Congenital group had the most problems with persecutory ideation.

Clearly, some craniofacial patients are living with psychological issues that could potentially impede the recovery process. When aetiology is considered, it appears that origin of injury or defect may further impact the particular psychological profile of each patient. Napolean (1993) and Grossbart and Sarwer (1999) note that psychological study

of the profile of patients seeking treatment for facial deviations is an essential part of the process of achieving positive surgical outcomes.

Our initial examination of patients post-surgically yielded promising results in terms of significant reduction in psychological dimensions of alienation, persecutory ideas, and thinking disorders for the patient sample as whole. When the group was divided on aetiology, each group had specific responses to reconstruction, with significant decreases in alienation for the neoplastic group, decreases in persecutory ideation for the trauma group, and decreased thinking disorders in the BAHA group. Unfortunately, as time progressed, these changes appeared to diminish and the psychological dimensions previously discussed returned to pre-operative values. These results coincided with our findings that sense of well-being did not improve with surgical intervention, either initially after surgery or after a more extended period of time.

It is possible that the psychological health of patients needs to be better attended to and is as important to recovery as the management of the wound site or prosthetic construction. While the faces function is restored and the individual's features approach normalcy, there has been a period of time in which the person has lived with a distorted visage. The social and intrapersonal consequences acquired over the time living with the defect surely can not be altered with the same speed that the surgical process alters the face. The repair of the psyche is a process that is not instantaneous and requires support. Unreasonable patient expectations and at-risk psychological status prior to surgery may be having an unwanted effect on the overall recovery process. This would support the hypotheses forwarded by Jensen (1978), Wilkes and Wolfaardt (1988), and Borah and his

colleagues (2000). In addition, a comprehensive understanding of, and sensitivity to, what each patient and aetiological group brings to the process, may further improve the results and achieve the hoped for outcomes.

Recommendations

It appears that a proportion of the general patient population referred to COMPRU have some symptoms of psychological disturbance that can be found when using the Basic Personality Inventory as a tool. The importance of identifying these cases and then providing more specific clinical assessment and treatment of psychological problems can aid in the overall recovery process. While a high score on only one scale does not necessarily represent a severe pathology, it does represent an area that can be addressed by a clinician. The Basic Personality Inventory functions well in terms of its general purpose as a screening instrument for severe pathologies and ability to assess the levels of psychological dimensions that may later become impede recovery such as depression and anxiety.

One recommendation, not just for further research but also to be a regular part of patient care, is to provide psychological intervention for problems encountered prior to surgery, such as inappropriate expectations or anxiety, at the COMPRU facility. This would enable the facility to provide complete continuity of care and the individuals that would work with the patients would be better versed in the specific needs of craniofacial patients. The effectiveness of this intervention could then be monitored and its effects on surgical outcomes could be assessed. Also, continual psychological support after

surgery should be offered so that recovery is maximized with the consequent benefit of improving patient quality of life.

Another recommendation for future research is to address the methodological limitations of this study. This would include a comparison control group and larger sample size so that the between group differences can be better explored. For example, the BAHA group should be compared to a control of hearing loss patients that use bone conduction hearing aids. Our last sample, the pre-post-post group is very small and we need to be extremely cautious in drawing conclusions from those data. The timing of instrument administration also needs to be standardized with equal periods between each major event (Sheppard,1992).

As the data continues to be collected from the patients at the COMPRU facility, the sample size will increase and more clear identification of unique aetiological group differences can be made. Also as the sample size increases, we can also increase the number of variables that may make patients differ from each other, such as by the severity of injury or aesthetic damage and location of injury or defect. A comparison of intraoral and extraoral patient groups is one example of how this could be done. This comparison may show differences in psychological dimensions associated with attractiveness based on the visibility of the defect.

Continuation of this research, that is the examination of psychological variables that may place some of these patients at-risk for full recovery, is highly recommended. Further exploration would help clarify the relationship between appearance and psychological health. On a more pragmatic note, this type of research will help the

professionals in this area develop programs that could more effectively meet the needs of

their patients.

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